Telephony.

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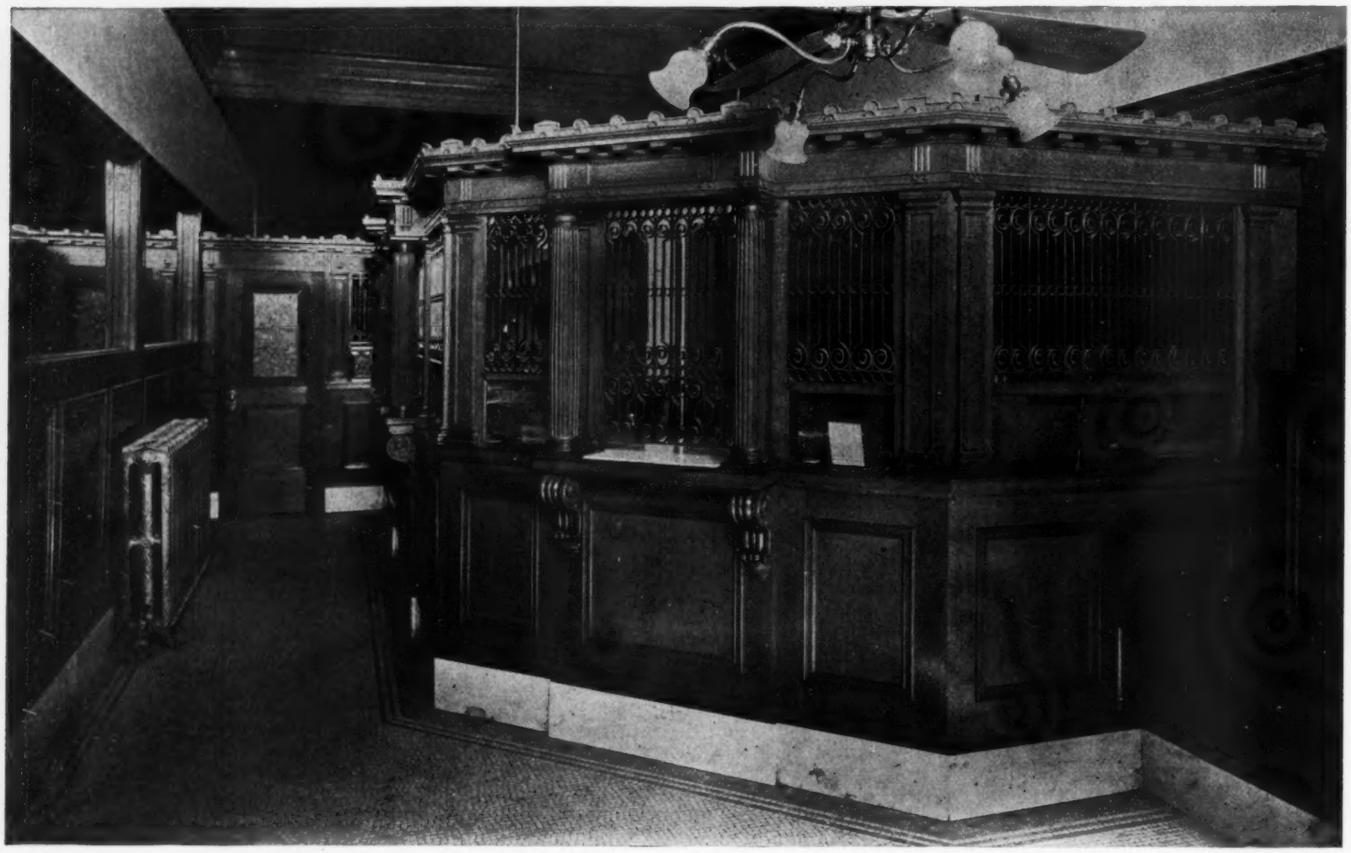
The Toledo Home Telephone Company.

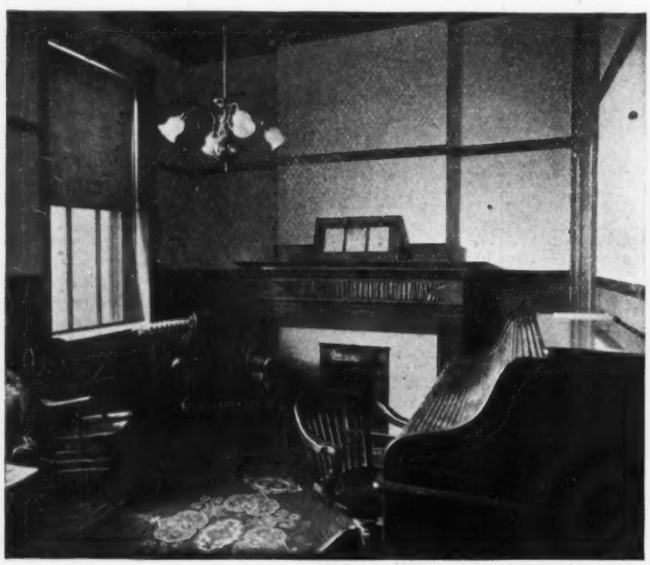
We present to TELEPHONY readers this month a comprehensive sketch of one of the largest installations of an Independent telephone plant in the United States—namely, that of the Toledo Home Telephone Company, Toledo, Ohio. There had been for several years what was called an Independent plant in operation in Toledo called the Harrison Company, but for reasons unknown it did not compete with the Bell company, nor did it grow or give efficient telephone service. This condition of affairs was tolerated by the Toledo public for several years. In 1901 the merchants demanded competitive telephony, wanting to be assured of its successful culmination and wishing positive guaranty that it would be Independent when in operation. The matter was put in the hands of the Cen-

BUILDING OF THE TOLEDO HOME TELEPHONE COMPANY, TOLEDO, OHIO.

tral Construction company, which name is a guaranty of stability, independence and worth. The entire work of organization, construction and operation was taken up by this company and after a bitter contest and an unusual amount of opposition from the Bell company a franchise was secured in the early part of 1901. The actual construction of the plant was commenced immediately after securing the franchise. It is safe to say there has not been a better constructed telephone plant in this country up to the present time. Money and time not being the essence of the undertaking, perfection and merit has been the result. The work has reached a state of completion which insures for Toledo one of the finest, best and most modern equipped telephone plants in the world.



COUNTING ROOM.—TOLEDO HOME TELEPHONE CO.

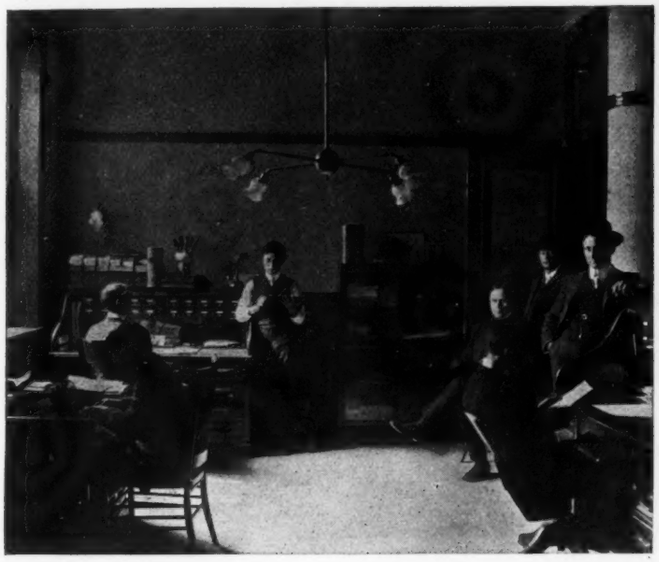


PRESIDENT'S OFFICE.—TOLEDO HOME TELEPHONE CO.

The Toledo Home Telephone company is a local concern comprised of over two hundred of the most prominent financial and business men in the city. The officers of the company are: Ed. L. Barber, president; Robert E. Hamblin, secretary and manager; James D. Brailey, Jr., treasurer. The directors of the company are: Ed. L. Barber, James S. Brailey, Jr., Marcus V. Barbour, Minot I. Wilcox, Jay N. Secor, Thomas H. Tracy, Celian M. Spitzer, James

GENERAL MANAGER'S OFFICE.—TOLEDO HOME TELEPHONE CO.

J. Robinson, Daniel C. Shaw, Arthur B. Tayler and Robert E. Hamblin, all of whom are leading men in Toledo and northern Ohio. The capital stock of the company is $2,500,000. To secure a suitable home for this business it was necessary to erect a fireproof structure, especially arranged and adapted for conducting the same. This structure is located on Superior street, near Madison. Its construction was commenced in the fall and pushed to completion during the middle of winter. It is three stories high and an ideal home for the company, being elegant, substantial and convenient. It is one of the finest in the



CONTRACTING DEPARTMENT.—TOLEDO HOME TELEPHONE CO.

United States. On the first or ground floor there are located the offices of the president and treasurer, cashier's office, general manager's office, contract department, engineer's office, superintendent of construction office, directors' room, a large waiting room and the long distance telephone room, handsomely equipped with Sterling Electric Company's switchboard and modern long distance telephone booths. The second floor accommodates the offices of the superin-

ACCOUNTING DEPARTMENT.—TOLEDO HOME TELEPHONE CO.

tendent of equipment; an operators' dining-room, equipped with a full complement of tables, chairs, table sittings and sideboard; adjoining the dining-room to the right is a modern kitchen equipped with gas ranges, pantry and cooking utensils of all kinds. To the left of the dining-room is a luxuriously furnished lounging or sitting room. Elaborate locker and toilet rooms for the operators occupy this floor. The remainder of the floor is taken up with the engineering department, the power room, which contains the power boards and charging and ringing machines nec-

LUNCH ROOM.—TOLEDO HOME TELEPHONE CO.

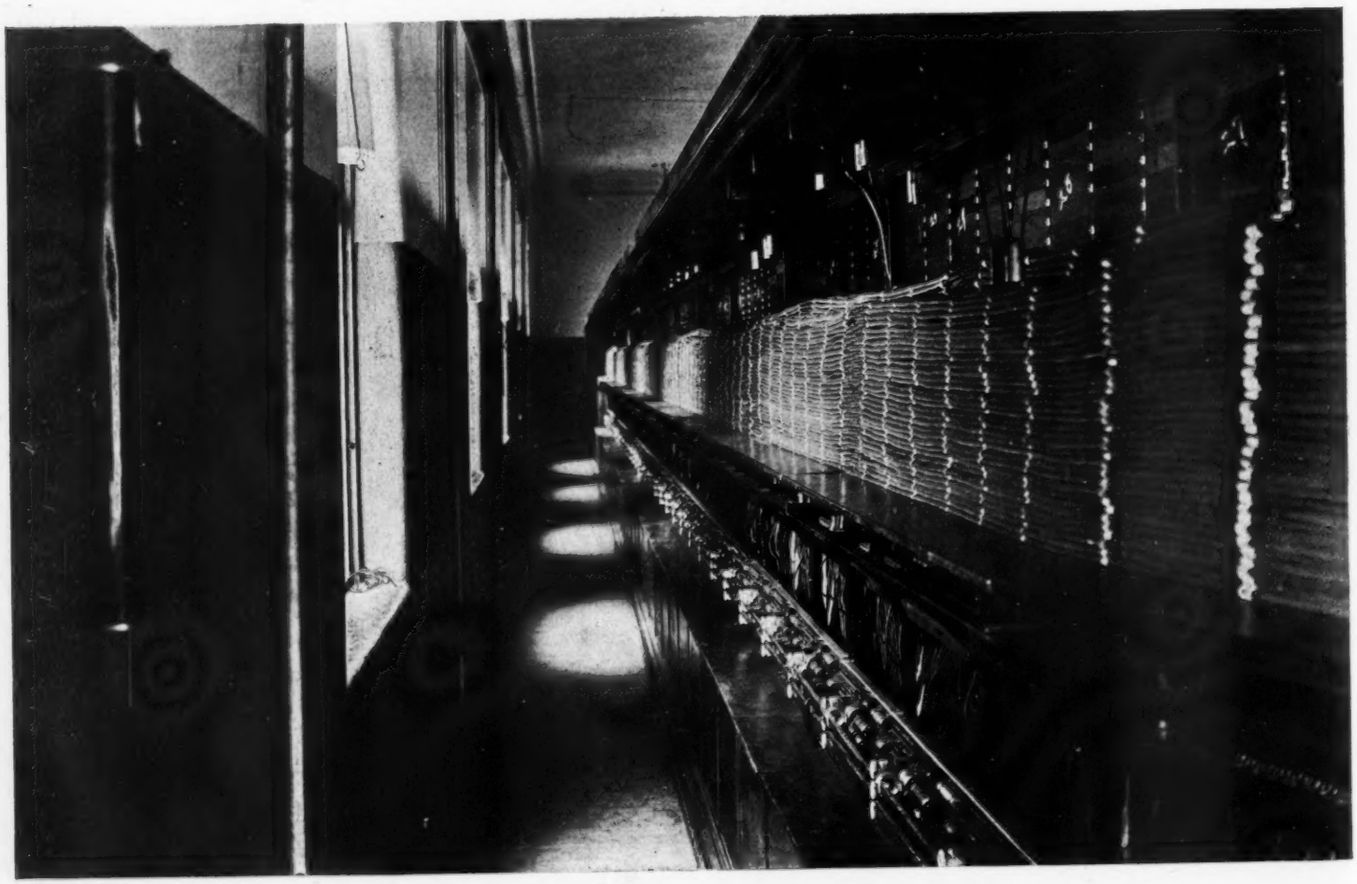
essary to operate the plant. The storage battery room carries one of the largest batteries of chloride accumulation storage cells ever installed for telephone work; the main and intermediate distributing rack, which is combined with the relay rack, all of which are equipped with the underwriters' guaranteed protection manufactured by the Sterling Electric Company. The wire chief's equipment of desks and apparatus is located in this terminal and distributing room, and is supplied with all known apparatus

OPERATORS' LOUNGING ROOM.—TOLEDO HOME TELEPHONE CO.

for quick and accurate location of troubles and necessary tests.

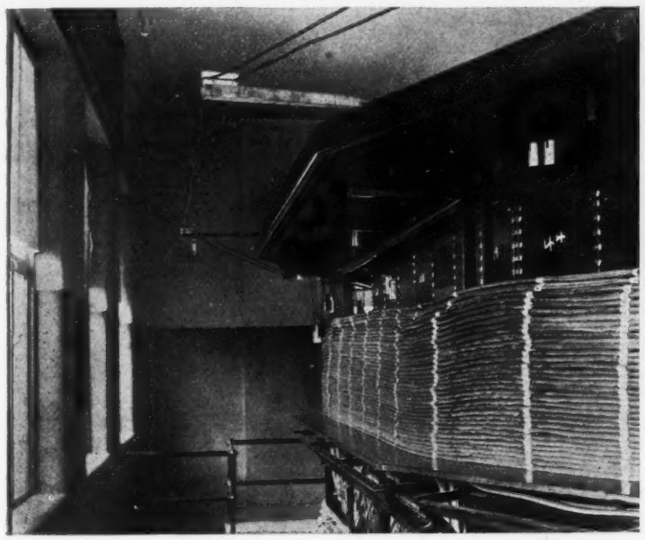
The third floor is given up to the switchboard. This room is a model for its intended purpose; the light being perfect and equally distributed and the heating and ventilating perfect. This room is equipped with a 12,000 capacity common battery lamp signal multiple switchboard, known as the single relay system, manufactured by the Sterling Electric Company. It is probably the largest initial installation yet made in the telephone field and is said to be the

CHIEF OPERATOR'S DESK.—TOLEDO HOME TELEPHONE CO.



REAR VIEW OF SWITCHBOARD. TOLEDO HOME TELEPHONE CO.

most modern and complete apparatus obtainable. The board is in the shape of a horseshoe, occupying all of one side, one end and half of the remaining side of the room. It is said to be giving excellent satisfaction and the service rendered is such that rapidly increases the list of subscribers. There are five thousand telephones in working order at the present time and new subscribers are being connected at the rate of two hundred per day. This work will continue until upward of eight thousand subscribers are connected, as the company now have eight thousand contracted for service.



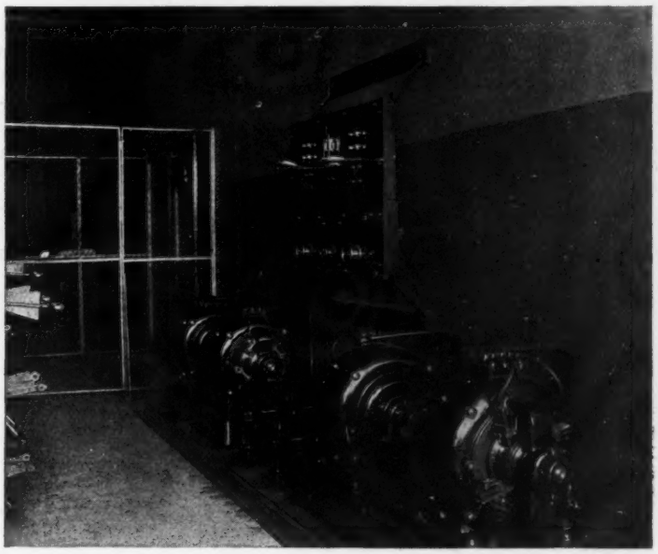
REAR CORNER VIEW OF SWITCHBOARD.—TOLEDO HOME TELEPHONE CO.

The front part of the third floor is given up to operators' parlors, ladies' toilet rooms and a hospital. The basement of the building is used for a store and stock room and the underground cables.

To enable the reader to form some idea of the magnitude of the work undertaken by the Home Telephone Company at Toledo, Ohio, we will make mention of the amount of material consumed in the construction.

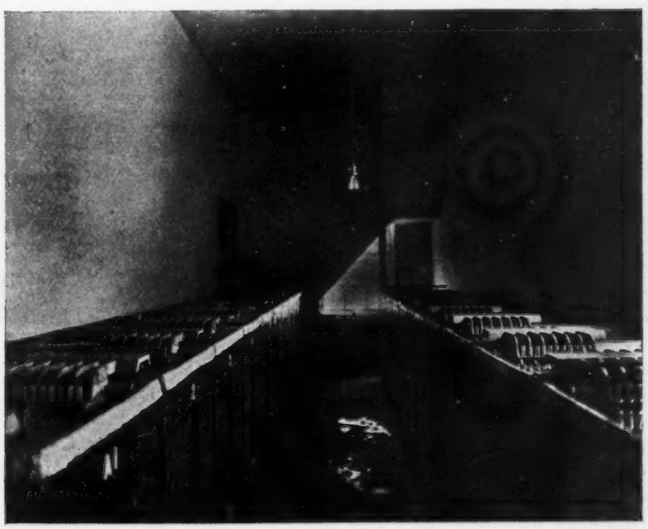
POWER BOARD.—TOLEDO HOME TELEPHONE CO.

There are between 5,000 and 6,000 large poles used within the city limits, and over five miles of underground cable within 400,000 duct feet of conduit. The underground work, which has one hundred and sixty manholes, covers the entire business portion of the city and covers quite a good deal of the residence portion. There are 160,000 feet of underground cable, 312,000 feet of aerial cable and over 2,000 miles of copper wire. If all the wire contained in the cables, together with the bare wire used in Toledo, was arranged in a straight line it would reach once around the world. The outside construction is arranged for an ultimate capacity of 20,000 telephones and in the crossing of the Maunee river and Swan creek two thousand feet of submarine cable was required.



POWER PLANT.—TOLEDO HOME TELEPHONE CO.

In addition to this magnificent plant, installed and in operation at Toledo, the Home Telephone Company operates some fifty miles of toll lines in the country adjacent to Toledo, connecting up with country lines. It also operates three telephone exchanges in the counties adjacent to Toledo, in the towns of Maunee, White House and Sylvania. These exchanges are equipped with the best apparatus obtainable and are operated by the Toledo Home Telephone Company, charging a small toll fee for service into Toledo.



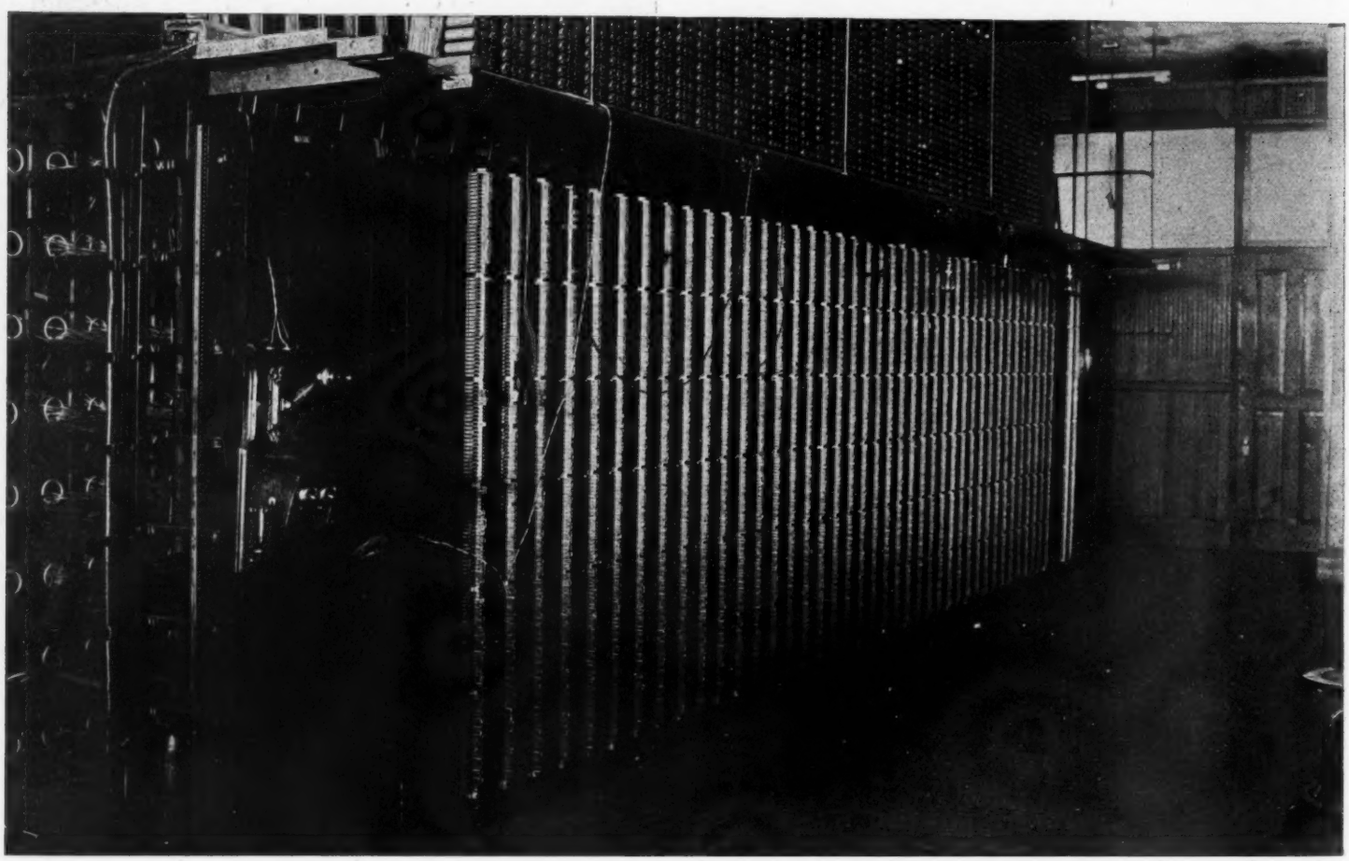
STORAGE BATTERY ROOM.—TOLEDO HOME TELEPHONE CO.

The company is also building a sub-exchange in East Toledo on the corner of Fourth and Main streets. It will occupy a building erected purposely for the service and will be thoroughly equipped with modern apparatus, having a capacity of 5,000 lines. It is expected that this exchange

will be in working order and connected with the main exchange within a short time when East Toledo and Toledo proper will be connected with each other over Independent telephone lines for the first time. The company has about 1,000 subscribers for service in East Toledo.

It is the intention of the Toledo Home Telephone Company to give straight metallic service to all subscribers and not make use of party lines. The service given up to the present time has been strictly up to standard and there is every reason to believe that the service will always remain so.

The company will have toll connections with all towns and cities which have Independent exchanges in the states of Ohio, Indiana, Michigan, Kentucky, Pennsylvania, West Virginia and New York, and in a short time will be able to connect with the large number of Independent exchanges



MAIN RACK CONTAINING RELAY RACK, MAIN AND INTERMEDIATE DISTRIBUTION.—TOLEDO HOME TELEPHONE CO.

in the southern part of the United States. For the accommodation of this business there is being installed at the corner of Eleventh and Wisconsin streets a complete modern toll station exchange solely for the handling of long-distance business. The Home company has the good will of every business man and telephone user in and near Toledo. With its influence, connections and service furnished there is every reason to believe that within a short period of time it will be the largest and most successful telephone plant in operation.

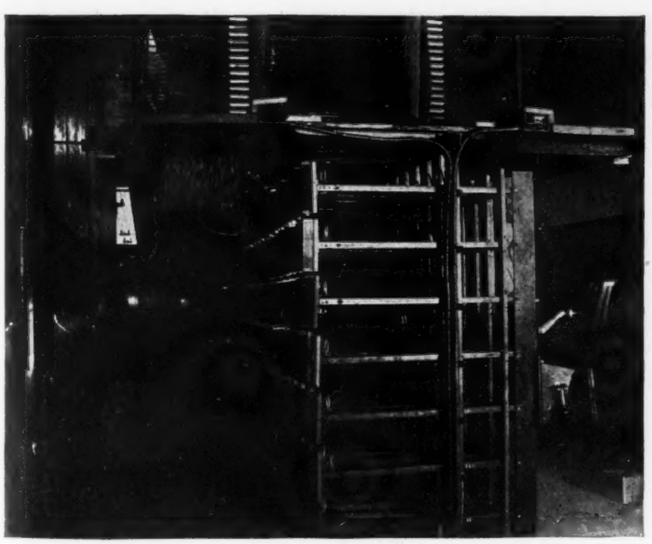
As the organization and successful construction and operation of this telephone property is wholly due to the Central Construction Company, we feel that some knowledge of this company will be of interest. The home office of the Central Construction Company is situated at Wauseon, Ohio, the company consisting of Ed. L. Barber, president, and James S. Brailey, Jr., manager. The company is a co-partnership affair, in which both parties hold equal shares. It was organized for the purpose of constructing and installing Independent telephone systems. The company, which is of great magnitude at this time, is like all other large concerns that are good—it started small and worked its way to the front. The first plant was built by the company at Wauseon, Ohio, in 1896. Then followed the construction of Adrian, Michigan; Napoleon, Ohio; Tiffin, Ohio, and other exchanges throughout the states of Ohio, New York, Kentucky, Michigan, Indiana, Pennsylvania, and at the present time the company is building in Missouri. The Central Construction Company has organized, constructed and financed twenty-seven systems in Ohio and more than fifty throughout the country. It has just finished the construction of the plant of the Louisville Home Telephone Company, with a capital of a million and a half, the Toledo company, with a capital of two millions and a half, and now have in the course of construction the plant of the Utica Home Telephone Company, Utica, N. Y., with a capital of five hundred thousand dollars, which plant will be ready for operation about January 1, 1903. The company will also have the plant at Kansas City well under course of construction and expects to have it in operation sometime before October 1, 1903. The company is actively constructing Independent long-distance telephone and telegraph lines throughout Kentucky, Indiana and Illinois, and is one of the largest owners of Independent telephone interests in the United States. It is also reported that this concern has reorganized the United States Telephone Company of Ohio, which is the long-distance company of that state and formerly under the control of the Federal Telephone Company of Cleveland. In the reorganization it is said the Central Construction Company will be in control of the property, which will insure its continued independence and connection with Independent telephone exchanges.

The Central Construction Company is a concern which can be looked upon with pride. It has succeeded in all of

its undertakings, large or small, and is beyond censure or suspicion of having any connection whatever with Bell interests. On account of delays and difficulties in securing the Kansas City franchise, the Independent telephone com-

EDWARD L. BARBER.

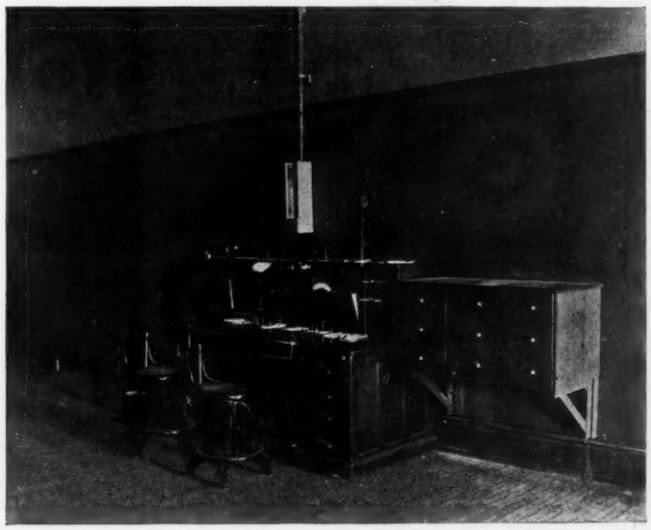
panies of Missouri and Kansas were doubtful as to the intentions of the Central Construction Company to build an Independent plant in Kansas City. This doubt arose from



VIEW OF MAIN RACK, SHOWING TERMINAL BLOCKS.—TOLEDO HOME TELEPHONE CO.

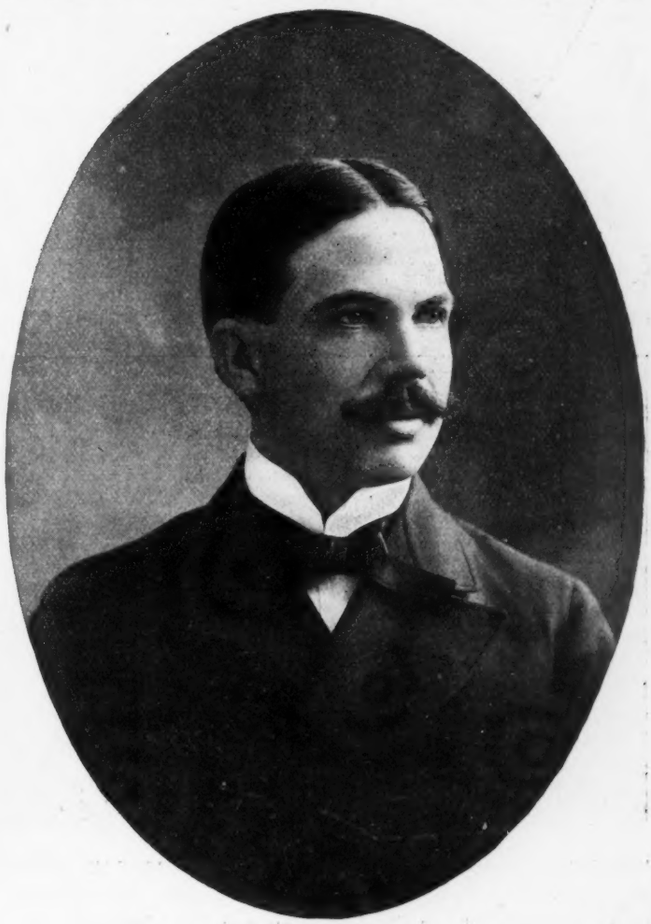
the fact that there had formerly been two franchises granted to Independent people at Kansas City, which had been turned over to the Bell company.

The secretary of the Kansas Association, which association met in convention at Kansas City upon the 10th and 11th of last month, took it upon himself to thoroughly investigate the Central Construction Company and its two



WIRE CHIEF'S DESK.—TOLEDO HOME TELEPHONE CO.

stockholders, Messrs. Barber and Brailey, and in such an investigation he addressed letters to the leading bankers throughout the Eastern and middle states. The answers to



JAMES S. BRAILEY.

these inquiries were read in open convention and were of such a nature as to show conclusively that the company was a strong organization, thoroughly Independent and

worthy of every confidence, and with the continuation of its past successful career the members of the company, in a short period of time, will rank with our leading financiers in the country.

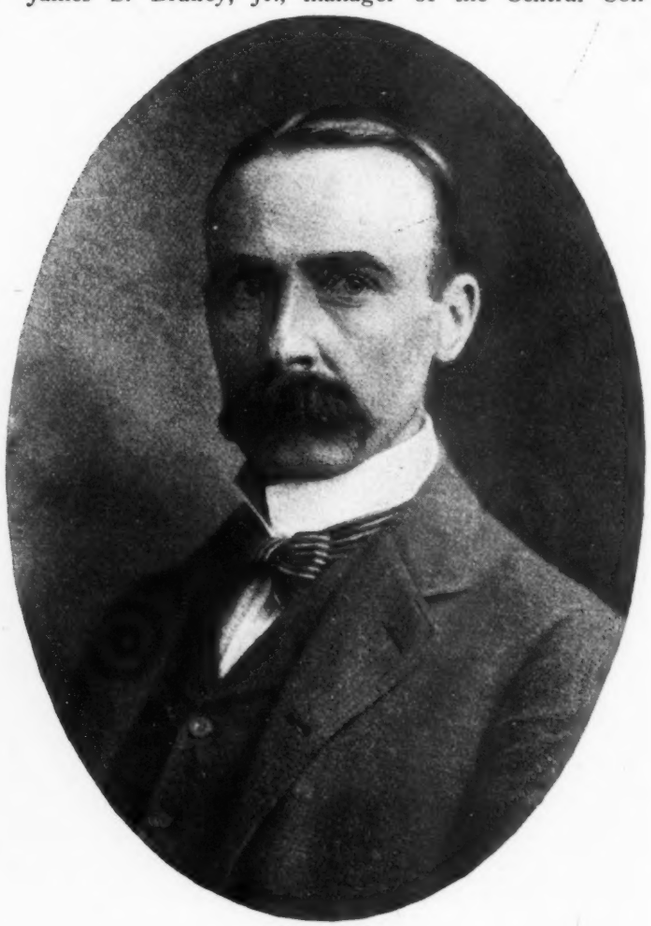
R. E. HAMBLIN.

Ed. L. Barber, president of the Central Construction Company, is a resident of Wauseon, Ohio. He graduated at Cornell University and has traveled a great deal. At one time he was engaged in business at Cleveland, but for the past ten years he has lived at Wauseon, his birthplace. He is a young man, about forty years of age; is president of a banking institution of Wauseon, as well as being interested in other large enterprises throughout the state of Ohio. He is a self-made man in the broadest sense and is one to whom his home city can point with pride. As president of the Central Construction Company he has demonstrated a shrewdness and capability of handling large problems which to-day places him in the front rank of successful business men.

UNDERGROUND CABLE RUN.—TOLEDO HOME TELEPHONE CO.

ENGINEERING DEPARTMENT.—TOLEDO HOME TELEPHONE CO.

James S. Brailey, Jr., manager of the Central Construction Company, can well be called the "Boy Napoleon," as he is now but thirty years of age. He received his early education in a Northwestern college and at a univer-



W. C. POLK.

sity in Cincinnati, finishing at the Ohio State University, from which he graduated as lawyer in 1894. It was his intention to practice his chosen profession until the Bell company's tyrannical treatment of the public attracted the attention of Mr. Barber and himself, at which time he decided to take up the financing, constructing and operating of telephone properties. Such plants as the Home Telephone Company, Toledo; the Home Telephone Company of Louisville, Kentucky; the Home Telephone Company of Utica, New York, stand as a monument to his generalship, sagacity and business ability. To him has been entrusted the management of the entire business of the company. The unprecedented success of all the properties throughout the different states speak more strongly than words of the ability and success of this young manager. With a continuance of the past successes Mr. Brailey will stand as one of the most successful managers and business men in the country. One of the able lieutenants of the Central Construction Company and a man who has been of considerable assistance in the success of later enterprises is W. C. Polk, the company's engineer, a comparatively young man to handle business of the magnitude of this company. He is, however, a man of unusual fitness for such undertakings and is recognized as one of the best telephone engineers in the country. Mr. Polk is thirty-three years old and was born and reared in Highland county, Ohio. His early education was acquired at his native town, New Vienna. Graduating from the local high schools, he immediately entered the Ohio State University at Columbus, graduating with honors with a degree of C. E. His first work in his chosen profession was railroad construction, acting as civil engineer in the construction of the Columbus, Sandusky & Hocking railroad, the Zanesville Terminal railroad and the Columbus & Sandusky short line. While serving with these companies he also acted in the capacity of mining engineer in connection with the companies' coal mines along the roads.

In the year 1895 he entered the services of the Central Union Telephone Company, having charge of all its conduit and cable underground systems throughout the states of Ohio, Indiana and Illinois. He later served as assistant general foreman for the same company, and also in the capacity of superintendent of construction of the northern Ohio district, which position he resigned June 1, 1901, to enter the ranks of the Independent telephone companies, realizing that it offered a much larger scope of action and greater possibilities than the old company. In June, 1901, he took charge of the engineering work for the Central Construction Company, since which time he has constructed the plants at Toledo, Ohio, and Louisville, Kentucky. At present he is engaged in the construction of the large plants at Kansas City, Missouri, and Utica, New York, all of which stands as a monument to his ability. Mr. Polk is an invaluable man to the Central Construction Company.

The future success of the Toledo Home Telephone Company, to a large extent, will depend upon its successful management.

Robert E. Hamblin will have charge of the Home property as general manager, which fact is a guaranty to its stockholders that the property will be judiciously, economically and successfully operated. Mr. Hamblin resigned the presidency of the Pomeroy National Bank, where he had been for several years, to accept a position in Toledo, in 1893. Since arriving at Toledo he has been engaged in different enterprises, but devoted his best effort principally to the Electric Inter-Urban railway interests. His record with this company was especially gratifying, the road having been run down considerably when he assumed charge of it, the stock selling at from fifty to seventy-five cents on the dollar. It was sold a little more than a year ago, bringing $1.50 on the stock.

He relinquished the position of secretary and general manager of this road and joined the Toledo Home Telephone Company last February, his first experience in the telephone business dating from that time.

TELEPHONE TALKS.

FRANK TURLEY.

While it is very essential in operating a telephone exchange that each department of the plant be kept up to the highest and best standard possible, one of the most important is the maintenance or inspection department.

In all exchanges the person in charge of the maintenance department should endeavor to bring about the highest possible degree of excellence in service. It is in this department that most of the service complaints are received and it will be conceded that poor maintenance creates poor service, and a general degeneration of the plant follows.

One of the most important details to be considered is the observation of conditions by the repair men or inspectors.

An inspector in the pursuit of his trouble should report to the wire chief all bad conditions of leads, places where inside wiring is poor, places where covered wire will have to be strung in, as in the case of leads going through trees, and all things in this line that may come under his supervision. The work of good maintenance lies solely with the chief inspector. In the clearing of a case of trouble the inspector should at all times conduct himself in a gentlemanly manner when talking to or in the presence of subscribers, whether they are "chronic kickers" or not.

Some inspectors are in the habit of going to a telephone, calling to the central office and walking out, without even looking the instrument over. The writer has known instances where men have been sent to investigate a case of trouble and by their remarks, while at instrument, gave out the impression that they would make better "bark peelers" than telephone men.

Next in importance to the maintenance department is the terminal or wire chief's room. It is here that trouble tests are made and the individual in charge of the inspection is stationed. Words cannot express the importance that is attached to correct records, and yet eight out of every ten exchanges will disclose bad card and cable records. A card record showing subscriber's name, address, cable pair in use, box, letter or number that pair distributes from, and telephone number, arranged numerically in a cabinet, is the easiest and handiest record that can be devised for such work. A cable record in book form, giving bridling, distribution and telephone numbers using the different pairs in a cable and kept correctly, affords proof of the card record.

In some instances the records are actually so bad that a lineman will be obliged to call from a cable pole to ascertain the conductor numbers of a telephone. The wire chief consults his record, finds a difference of pairs, and by tracing jumper wire from heat coil side to cable head, finds that both card and cable record is wrong. Such instances always cause delay and impair service and could be avoided by having a correct record.

A wire chief in the testing for trouble should determine as nearly as possible the nature of it. This is a very great help to the repair man, because after his trouble has been tested correctly he knows what to look for—ground, short circuit, open line or whatever the fault may be. This does away with a good deal of delay and the dispatch with which trouble is cleared marks the efficiency of the department. Another thing to contend with in many instances is the abominable practice of a manager whose knowledge of practical telephony is limited to assert himself and give instructions to the wire chief as to how he will place men in the clearing of trouble, etc., etc. This practice generally breeds discontent with those concerned, and besides, if a wire chief or chief inspector does not understand his work he should have no right to the title.

PRACTICAL TELEPHONY

Conducted by P. KERR HIGGINS, A. M. I. E. E.

ARTICLE I.—HISTORY.

The first telephone patent was issued in 1877, and since that time telephony has forced its way into every country on the globe. The advance has been solid, and from being a mere toy, its possibilities being believed in only by the few, it has become an indispensable adjunct of commerce. The United States supreme court in its opinion, delivered March 22, 1888, makes Mr. Graham Bell the recipient of all the honors of the invention proper, and while all honor is due to such other inventors as Drawbaugh, Gray, Hughes, etc., Bell was the one who made the receiver practicable, which, until the expiration of the patent, was the principal one in use. Since the patent expired, however, all kinds and conditions of telephone instruments have been placed on the market, some possessing a high degree of merit, while others are fairly good, and quite a number are merely put up for sale to catch the unwary. Long distance telephony was scarcely known until 1883. Small extensions had been made but were limited in length and were usually of iron wire. During the year 1883 experiments were conducted and lines built for this purpose by the American Bell Telephone company. These lines were made up of hard drawn copper wire and extended from New York to Boston; much information was thus obtained, demonstrating the possibility of long distance telephony. The outcome of this was the formation of the American Telephone and Telegraph company. The work of carrying lines all over the country was begun and has been extending ever since until, to-day, the country is one huge network of wires and conversations can be carried on for over two thousand miles. The line between Chicago and Boston was completed in October, 1892, covering a distance of one thousand and twenty-six miles, and produced better results than some lines of fifty miles in 1883. Briefly, then, this is the history up to the expiration of the patent, when new companies sprang into existence all over the country until to-day there are few towns which have not a telephone system; villages, towns, and cities are all in communication with each other and much business which took days to transact prior to the introduction of the telephone, is now possible in from five to thirty minutes. The farmers have also benefited, as they are now in direct communication all over the country and can receive the market rates without leaving their homes.

DEFINITIONS.

For the benefit of those not thoroughly familiar with the subject, I will explain some of the terms used in telephony proper and thus avoid explanations, from time to time.

Telephony is clearly divided into two main classes,—Magnetism and Electricity. They must, of necessity, be treated in this order, the first instrument being strictly magnetic in its working—no battery current of any kind was used. Under magnetism will be found the following expressions:

Magnetic Lines of Force.—If a bar magnet be laid under a piece of white paper and iron filings are spread or sprinkled on the paper over it, very pretty curves will be made by the filings as they arrange themselves in the magnetic field (Fig. 1). It will be observed that the filings gather themselves in clusters at the ends, or poles, of the magnet and that the lines formed at the neutral point, or center, of the magnet are faintest, indicating the extent of the magnetic field and strength of the magnetic lines of force. If a piece of soft iron be brought near the permanent magnet these lines of force would be changed, inasmuch as the piece of soft iron brought into the presence of the magnet would itself become a magnet, thereby increasing the magnetic field. From this it will be observed that soft iron placed in the magnetic field and having the lines of force passed through it, becomes itself a magnet. This principle is the fundamental one in the original Bell receiver, and a close study of the action is necessary to understand the principle of the receiver. If the magnet be broken, an effect as of two separate magnets will take place. It will be observed that the magnets have two poles (N. & S.) and that when the magnet is broken each has still two poles. If the inner ends (N. & S.) be brought together, it will be observed that they attract each other, but if like poles be brought together repulsion takes place, hence the rule, "Like poles repel, unlike poles attract each other." It may also be noted here that the earth itself is one huge magnet, hence

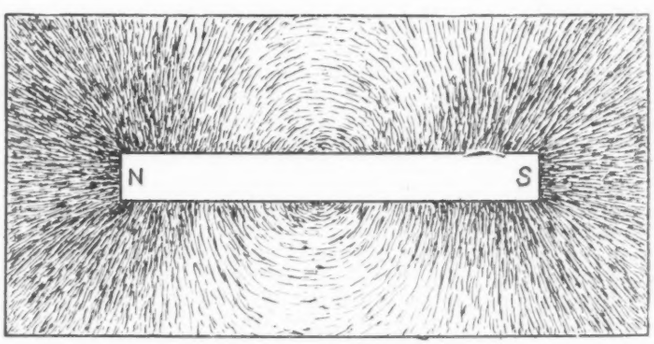


FIG. 1—MAGNETIC FIELD—SHOWING LINES OF FORCE

the term north and south pole, and the magnetic poles of the earth very nearly concide with the geographical.

Magnetic Induction.—It was observed when the piece of soft iron was brought within the magnetic field of the magnet that it became magnetized. This process of communicating magnetism, or electricity, without actual contact, is termed "induction" and the body so magnetized would have its nearest pole of opposite polarity to that of the magnet nearest. This can only be done in certain bodies such as iron, steel, nickel, cobalt, manganese, etc. Iron and steel are said to have a high co-efficient of magnetism, because of their being easily acted upon by another magnet. The lines of force will pass through air vacuum, glass, paper, etc., and in passing through these the lines of force are not changed, but in passing through magnetic bodies, such as iron and steel, the lines of force are intensified and increased. In the receiver the magnetism often becomes weak and it is necessary to strengthen it. This is done by passing the magnet of the receiver over the pole piece of a strong electro-magnet, always passing it in the same direction until the magnet has become strong enough to lift at least 16 ounces of iron. In telephone work the iron cores of coils, etc., should be of the very softest iron and possess a high degree of permeability. This is essential to avoid troubles which may arise from residual magnetism. The complete success of the telephone lies in the combination of magnetism and electricity, the former being intensified by

the latter and permitting the transmission of speech to long distances.

ELECTRICITY.

Current may be defined as electricity in motion, the unit being the ampere, electro motive force (E) as the pressure forcing the current through obstructions, the unit being the volt, resistance (R) as the hindrance placed in the path of the current, which must not be confounded with retardation, the unit being the ohm.

Retardation.—Impedence differs from resistance in that the energy is expended in magnetizing, and only occurs when material having magnetic properties is used, such as iron cores, etc., and is sometimes known as electro magnetic inertia.

Self induction is due to opposing currents in the wire itself, each wire being composed of several small wires and the current being varied at any time sets up opposing currents. This may be reduced by using stranded conductors. Self-induction is greatest in coils where the layers are close to each other. These two, retardation and self-induction, are both a help and a detriment in telephone working, as will be seen later.

Conductivity may be briefly defined as the converse of resistance. In practice it is common to consider silver as 1 and approximate all metals from that basis.

Potential is the difference in the strength of current taken at two or more points in a circuit, and the greater the difference, the greater will be the flow of the current.

Circuit may be defined as the whole path through which a current is flowing, consequently reducing the path would be termed "short circuit."

Insulators are made of material offering high resistance to the flow of the current. There is no perfect insulator. Of the insulators in use gutta-percha is probably the best, with glass second; porcelain also is a good insulator and greatly used in telephony. These are used to confine the current in a definite direction and form a very important function in telephony.

Ground.—This is a term frequently used in telephony, and indicates a connection by means of a wire to a large copper plate, or some other good conductor placed in the ground, and is either used as a protection against damage by lightning or to complete a circuit. (Fig. 2.)

A metallic circuit differs from a single circuit in that it has no ground connection; these are now used in telephony almost exclusively. (Fig. 2.)

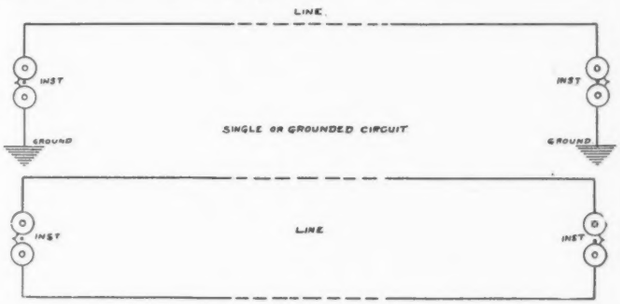


FIG. 2 DOUBLE OR METALLIC CIRCUIT

Induction, cross talk and noisy lines, in telephony, are usually due to lines running parallel to each other for long distances; these may be grounded or metallic lines, but in the latter the minimum will be had. There is only one way to completely overcome this disturbance, and that is by using metallic circuits, two wires, and then by systematic transpositions (to be explained later), to divide up the circuit so that the exposure to the disturbing wire or wires is uniform on both sides of the circuit. The number of transpositions will depend on the distance between the wires and the length of the circuits. In aerial lines it is found necessary to transpose only every thirteen hundred feet, but in cables, where the diaelectric is other than dry air, they have to be twisted in pairs every few inches.

Capacity or static induction is another form of retardation and is the chief hindrance to long cable work. The unit is the farad, but in practice the micro-farad is used.

DECISIONS AFFECTING TELEPHONY

Conducted by ANDREWS & MURDOCH, Berrien Springs, Michigan.

TELEPHONE POLES IN STREET.

H. D. Allert, and others, were granted a franchise to construct and operate a telephone system in the city of Langdon, North Dakota. They proceeded to perfect such system, and, in doing so, placed two telephone poles in front of a lot belonging to E. I. Donovan, whereon was situated his residence. One of these poles was set two feet from the sidewalk, and directly in front of a walk leading from the sidewalk up to the dwelling house. Allert and his associates did not pay Donovan for such use, nor offer to, nor did Donovan consent to such use of the street. The streets and alleys of the city were given and dedicated for public use by the original proprietors of the town site. Donovan brought action, seeking to permanently enjoin the defendant from erecting telephone poles in front of his lots. In the trial court judgment was rendered for the defendant. This, however, has just been reversed by the supreme court of North Dakota, in a learned, though somewhat lengthy, opinion, in part as follows:

"The primary use of a street or highway is confined to travel or transportation. Whatever the means used, the object to be attained is passage over the territory embraced within the limits of the street. Whether as a pedestrian, or on a bicycle, or in a vehicle drawn by horses or other animals, or in a vehicle propelled by electricity, or in a car drawn by horses or moved by electricity, the object to be gained is moving from place to place. The same idea is expressed by courts and text writers, that 'motion is the primary idea of the use of the street.' The defendants claim that the use of the street for telephone poles is within the use contemplated, as it facilitates the transmission of intelligence, and makes intercommunication between persons possible without the use of the street, and thus lessens travel by persons on the streets, and thereby renders travel thereon free from the annoyance and inconvenience of crowded streets. There is force in the contention, and several courts have adopted the view that the use of poles for such purposes is within the purpose of the original dedication, and therefore not a new use nor an additional burden on the street, because such use pertains to travel on the street. That it lessens travel on the street is admitted. That, however, is hardly the test. The question is, does it lessen travel on the street by such means as cause a permanent obstruction of the street for a purpose not within the original dedication? The plaintiff is entitled to free

access to his house, and to light and air for his house, without obstruction. If, for any public purpose inconsistent with the grant to the public of the use of the street, the street is obstructed in front of his lot abutting on such street, such use entitles him to compensation. If within the original purpose, and he is not obstructed in gaining access to his lot or building, and not deprived of light or air, he is not entitled to relief or to compensation. The city had the right to authorize the defendant to construct a telephone system in the manner described, if it did not infringe upon any of the property rights of the plaintiff to the street by virtue of his ownership of the lot. Neither the city council nor the legislature could deprive the plaintiff of compensation for his property rights in such lot, if the telephone poles set thereon are not a use of the street, within the purposes for which the easement was originally conveyed to the public. The legislature cannot deprive the plaintiff of his property rights without his consent and without compensation. The constitution prohibits such taking or damaging of his property, even for public purposes, without first procuring his consent or first compensating him. The legislature may authorize the use of the easement of the public in the street, but not to the damage of the owners of real estate fronting on such street, unless condemnation or consent or compensation is first made or given. The streets of said city were given to the public for public use. What is understood by 'public use'? The primary intention and idea of the use of the street was for travel,—moving from place to place in any way that does not interfere with the use of the street for travel in any other way. The manner or mode of travel is not restricted to those known or in use at the time of the dedication, but may be those modes of travel that are the result of modern inventions. The new modes of travel must not interfere with the property rights of the abutting owner, nor with the use of the street in all other ways by the public, as contemplated or existing at the time of the dedication or later. The fact that the statute designates the telephone as a public use does not authorize the use of the streets by it without restriction. If the use of the telephone on the streets interfere with travel, or is inconsistent with the use of the streets for travel, as originally dedicated, or is injurious to the property rights of abutting owners, the legislature may authorize it to be placed on the streets, but cannot in any manner deprive the abutting owner of his property rights, nor deprive him of the right to compel payment for the use or damage of his property.

"Our conclusion is that the placing of the poles in the street in front of plaintiff's dwelling house in this case is an occupancy of the street inconsistent with the dedication of the street for the use of the public for travel; that it constituted an additional burden or servitude upon the street, not within the purposes of the dedication; that the public has an easement in the street for travel and passage thereon by any means not inconsistent with the rights of abutting property owners; that the placing of these poles in this street is an interference in some degree with travel on the street, and also encroaches upon the plaintiff's right to the free and unincumbered use of such street for all purposes."

Donovan vs. Allert *et al.*, 91 N. W. Rep. (N. Dak.) 441.

Kansas Independent Telephone Convention.

Perhaps the best Independent telephone meeting ever held in the Southwest was that which listened to Mayor James A. Reed's address of welcome in the convention room of the Coates House in Kansas City on the morning of September 11. It is not usual for state organizations to meet outside the state which they represent, but in this instance there was a peculiar fitness in the holding of the Kansas Association meeting just beyond the border. That the greater portion of Kansas City is on the Missouri side of the imaginary line separating the states is simply a geographical accident. Kansas City, commercially speaking, is the metropolis of Kansas, just as St. Louis is of Missouri and Chicago of Illinois, Iowa and Wisconsin. Kansas City's commercial territory extends eastward perhaps one hundred miles, while to the southwest it reaches the foothills of the Rockies. Remove Kansas City from the map and Kansas City's greatness would be but a memory. As in Italy "all roads lead to Rome," so in Kansas all railroads lead to Kansas City.

So should all telephone lines, but for weary years the Bell company have, by desperate efforts and at enormous expense, succeeded in keeping competition out of Kansas City. Numerous disappointments had rendered the people of Kansas City and the Independent interests in the territory surrounding almost hopeless of ever realizing their dream of Independent exchange service. When, however, the Kansas City Home Telephone Company, with Messrs. Barber and Brailey in the van, entered the field during the past winter, matters took on an entirely different aspect. Work was not only begun, but kept up, and the commotion wrought thereby in the Bell camp has been grievous and abateth not.

Stories to the effect that Messrs. Barber and Brailey were really working in the interests of the Bell; that the Home franchise was in the hands of the Bell people, were so persistently and industriously circulated that many Kansas City people, in the light of past failures, accepted them.

The meeting of the association at Kansas City has demonstrated to the public there, as perhaps nothing else could have done, the falsity of these rumors, and the confidence of the Independent telephone men of this territory in the successful completion and operation of the Kansas City Home Telephone Exchange. Probably no Independent telephone convention ever listened to such a speech of welcome as that accorded to the Kansas Association by Hon. James A. Reed, mayor of Kansas City. Practically every delegate present was aware that Mayor Reed had a national reputation as a logical, forcible and eloquent speaker, but few of them were prepared for the revelation of his deep study and thorough familiarity with the telephone situation, as evidenced by his speech. Failure to have a stenographer at hand in time to secure that speech entire has resulted in serious loss to Independent telephone literature. Here are a few extracts:

"The present condition of the telephone service here is lamentable. Relief must come either through government ownership of a good system or through an able, efficient, honest and honorably managed corporation." * * * "Either of these methods bars out the Bell." * * * "The Bell company, which never did an honest act in its life, takes out of Kansas City, at a low estimate, $300,000 annually, and yet in its last sworn statement to the assessor gives the entire value of its property in Jackson county at $22,000." * * * "I will not extend to you the freedom of the city, for I know that, should you have occasion to use a Bell telephone, you will violate at least one of the commandments and probably the laws of the state."

The thanks of the convention for the mayor's hearty welcome were ably conveyed by W. H. Nelson of Smith Center, member of the executive committee, in a few well-chosen words.

Committees were then appointed upon "credentials," "amendment and revision" and "resolutions." Reports of secretary and treasurer were presented and showed the

association to be in excellent condition financially, no assessment other than membership fees having been necessary as yet to meet the running expenses of the organization. The remainder of the forenoon session was taken up with informal discussion, report of committee on credentials and the election of a number of new members.

At the afternoon session, Thursday, the Independent toll line map of the state was revised and brought up to date, and arrangements made for the issuing of blue prints thereof.

The able papers upon "Construction and Maintenance of Metallic Toll Lines," by Harry Faris of Chicago, and "The Enforcement of Message Time Limits," by W. W. Dilworth of Beloit, were read and discussed. There is a very general movement on the part of most of the prominent companies toward the fullest enforcement of the five-minute limit, consistent with the character of the service. Remarks by prominent members upon the condition of Independent interests in several important cities of the state furnished very interesting topics for the remainder of the session.

The comprehensive work of the Independents in Kansas was forcibly illustrated by this discussion. Telephone men will understand that local exchange and toll lines are the firm foundations of successful business, and in these the extent of the Independent interests in Kansas makes the Bell "look like thirty cents" in comparison.

The evening session was held, as arrangements had been made by the Kansas City Home Telephone Company, assisted by the B.-R. Electric Company, Kansas City Telephone Manufacturing Company, Hodge-Walsh Company and W. T. Osborn & Company, to entertain the visitors at a theater party. Delegates to the number of one hundred and fifty attended the performance of John H. Stoddart in "The Bonnie Brier Bush" at the magnificent new "Willis Wood" theater, said to be the finest west of Chicago.

The visitors were thoroughly capable of understanding that they had been shown the "best what is" in that line and were not chary of expressing their appreciation.

Owing to the large amount of work to be done by the committee on amendment and revision, they were not prepared to report at the convening of the Friday morning session, and they were given further time. Mr. Hugh Dougherty of Bluffton, Indiana, vice-president and member of the advisory board of the National Association, was in attendance and addressed the convention, giving in considerable detail the history of the defense of the Berliner and Carty suits. This information was a revelation to many of the delegates present and threw a strong light upon the labors and efforts of the Independent interests to defeat these infamous impositions. Mr. Dougherty asked that the convention appoint some prominent man identified with the Independent movement in the Southwest to act in conjunction with the National Committee having these matters of litigation in charge. The choice of this representative was placed in the hands of the executive committee, who nominated Hon. Frank L. Brown of Topeka. Certainly no wiser choice could have been made, as Mr. Brown is a thorough man of affairs, has an extended knowledge of both legal and political matters and as an energetic and successful Independent investor commands the confidence of the entire association.

EXHIBIT STROMBERG-CARLSON TELEPHONE MANUFACTURING CO., KANSAS CITY CONVENTION.

The Friday afternoon session was called to order at two p. m. and at the request of Messrs. Barber and Brailey a recess was immediately taken to visit and inspect the conduit work, supply houses and pole yards of the Kansas City Home Telephone Company. Two special trolley cars were provided and the delegates were shown, as one of them expressed it, "enough telephone material to provide for 25,000 telephones." In fact, the conduits of the new Kansas City plant are being built with a view to an ultimate capacity of nearly double that number.

Upon the return of the delegates the meeting was called to order and proceeded to the real business of the convention—the consideration of the amendments to the constitution. These included a number of additions, among the more important of which were, first, a rule prohibiting the making of contracts for connection or interchange of business with any other than Independent companies, and, second, a rule requiring members intending to build toll lines to first give notice to the association and secure permission.

In adopting the former unanimously the association gave notice that it would tolerate no "monkeying" with Bell connections. In the latter, it is believed that a position has been taken which, while protecting the territory of each local company, will still prevent the owners of poor and inefficient lines from pursuing a "dog in the manger" policy to the detriment of the whole Independent interest.

The discussion of the various amendments, of course, consumed considerable time, so much so that it was found necessary to pass two papers which were on the program for that afternoon, viz.: "Economy and Advantages of Party Line Service," by Max K. Zabel of Chicago, and "Central Energy for Small Exchanges," by J. J. Nate, Chicago. A number of delegates expressed regret at not hearing these papers, as both are subjects of considerable interest to up-to-date exchange men; but as both papers will doubtless be published in the telephone journals they could much better be omitted from the program than the business matters.

After adopting the report of the committee on resolutions, which expressed the appreciation of favors extended by Mayor Reed, the Kansas City Home Telephone Company and the electrical jobbers of Kansas City, the convention adjourned.

In general satisfaction and enjoyment and in the amount of real work accomplished, this meeting could hardly be criticised. It is certainly agreed by all that much good has been accomplished, both for the members of the association in general and the Kansas City Home Telephone Company. Several of the manufacturers had creditable exhibits, which were of considerable interest to the visitors and delegates.

Raw Material Used in Telephone Apparatus.

A Series of Articles by H. M. Deavitt.

PRIMARY BATTERIES.

As the telephone is in use under ordinary circumstances for a few minutes only, it is desirable for economical reasons, as well as for satisfactory service, to select a battery in which no action takes place when the line is idle. For this reason the batteries in use in telephone service to-day are those which contain neither acid solutions or acid salts, so that when no connection is made between the electrodes no chemical action takes place in the solution.

Several years ago the Leclanché battery was the type very generally used, but later the dry battery has been introduced and its use has increased to such an extent that at the present time it seems destined to supersede to a very large extent all forms of the wet battery. The popularity of the present-day battery is due, first, to its cheapness, second, to the fact that little attention is given to it after it has been placed in service. Being free from corrosive liquids, it does not in any way attack the metal parts of the instrument. While with the wet battery it is necessary for the inspector to change the solution from time to time, as well as clean the parts, with the dry battery it is only necessary when the cell is exhausted to replace it with a new one and the other is thrown away.

Because of the present popularity of the dry battery the number of manufacturers, already numerous, is constantly increasing, and turning them out by the thousands has enabled them to buy the material in large enough quantities to get the very lowest price, and because of the keen competition has made the margin of profit so small that the telephone companies can buy them cheaper than they can manufacture them. Competition is so keen that there is a tendency to sacrifice efficiency for cheapness, and at the present time instead of using the best material than can be obtained, if it is found that cheaper ingredients will do the work at all, is to turn out a battery which is of short life. It is for this reason that many of the dry batteries which are on the market to-day are of very little use. Its construction is such that a slight variation, either in the quality of the material itself or in the way in which it is put together, is apt to increase the internal resistance and thus reduce the E. M. F.

The Laclanché battery, while not in so common use as formerly, is still used in considerable quantities by the Bell telephone, nearly every instrument with a Blake transmitter using a cell of this type. The Leclanché cell has for its depolarizer granules of manganese dioxide mixed with broken gas carbon to increase its conductivity. The negative plate is baked carbon and is inserted in a porous cup, which is filled with mixed manganese dioxide and carbon and sealed at the top with sealing wax in which two small vent tubes are inserted. Through the top of the carbon plate is attached the binding post. A positive electrode, consisting of a zinc rod about one-half inch in diameter, is immersed in the electrolyte, a solution of sal-ammoniac in water.

The manganese dioxide used in this cell is of such a nature as to give up a part of its oxygen, which combines with the free hydrogen to form water, and thus overcomes the polarizing from the free hydrogen. In making up this battery five ounces of pure sal-ammoniac are dissolved in water and the porous cup is allowed to stand in the solution for twenty-four hours before use in order that the ammonium salt may become thoroughly diffused through the porous cell. The initial E. M. F. of this cell is from 1.4 to 1.7 volts, and the internal resistance varies from ½ to 2 ohms. When in use the cell polarizes rapidly, but as soon as the circuit is broken gradually recovers to nearly its original voltage.

The chemical reactions which take place within the cell are of a varied nature, depending upon the different conditions. As long as the circuit remains open no action takes place, as there is neither an acid or an acid salt present. When the circuit is closed the zinc displaces ammonium from ammonium chloride, forming zinc chloride, and liberates free ammonia gas, which escapes after the liquid is saturated, and hydrogen gas, which is oxidized by the peroxide of manganese. When the solution has become super-saturated from evaporation a double salt of the chlorides of zinc and ammonium is apt to crystallize on the zinc rod. These crystals which adhere to the zinc reduces the E. M. F. and increases the internal resistance, but may easily be dissolved by the addition of a few drops of hydrochloric acid.

The double chloride of zinc and ammonium gradually settles to the bottom of the cell, becoming more dense as the bottom is approached. Since zinc in a solution of ammonium chloride is positive to the zinc in zinc chloride, if the latter liquid also contains ammonium chloride, local circuits are found between the upper and lower portions of the zinc rod, resulting in a smaller E. M. F.

Because of their supersaturation from evaporation of the liquid when the cell is put in a dry place closed cells have been used with success. The cover used generally consisted of wood saturated with paraffine and attached to the porous cup, but removable from the outer jar. The cover also holds loosely the zinc rod, which can readily be removed. The cover fits on a shoulder in the top of the jar and a soft rubber ring makes it tight.

The above form of Leclanché cells have been modified so that it is possible to do away with the unglazed porous cup, substituting for the same a carbon cylinder as a recep-

tacle for the manganese dioxide. The recovery is not so rapid as in the other forms of the Leclanché cells, but they give a more uniform current, the low internal resistance is an important feature in this type of cells, being only $\frac{3}{10}$ ohms, and it thus has a high commercial efficiency.

Convenience commends the dry batteries to those who have no technical knowledge of batteries, as well as being useful when a liquid electrolyte is not desired. The excitant used is in the form of a paste, the composition of which is a secret. The zinc, composing the positive element, is the containing vessel, and is generally covered with a pasteboard box. The negative element is carbon and it occupies about one-half of the space in the cell. The initial E. M. F. is generally less than 1.5 volts. It polarizes very rapidly on a low external resistance, while the internal resistance, which is different for cells of different size, is very irregular during the working of the cell, probably on account of the slow and irregular diffusion of the product of the chemical action.

The store of available potential energy in this type of batteries is in general smaller than that of batteries containing a larger quantity of fluid.

The Law battery belongs to a type which has no depolarizer, depolarization being mechanically effected by the use of a large carbon surface. The negative element consists of a double cleft cylinder of carbon, containing the zinc rod within. The carbon surface in this cell is about 145 square inches, showing an internal resistance of .4 ohm with a current of .2 ampere. The jar holds about one and one-third quarts and about five ounces of sal-ammoniac is used for an excitant. To renew these cells requires only a new zinc rod and a fresh solution of ammonium chloride. The exhausted solution should always be thrown away and the double carbon cylinder should be thoroughly soaked in water and then dried to remove the absorbed salts. This cell is efficient and durable. While it polarizes more continuously than a Leclanché cell with a heavy current, for light work the polarization is not sufficient to be noticed. The initial E. M. F. is 1.37 volts.

The Diamond carbon battery has for its negative element seven rods of carbon 5½ inches long, ⅝ inch diameter, set in a soft metal top and secured by means of a set screw. The metal top is cast around a porcelain insulator, through which passes the zinc rod. Rubber rings serve as an insulator to keep the zinc coming into contact with the carbon. The top of the cells, as well as the insides of the cover and the upper end of the carbon, are paraffined.

Care should be taken not to allow any of the sal-ammoniac solution to get on the cover, as the crystallization and creeping of the salts produce a short circuit, causing the cell to exhaust itself on apparently open circuit.

The initial E. M. F. is 1.36 volts, has low internal resistance and the recovery is very good.

Besides the carbon batteries already mentioned there are two others with slight modifications. In one the carbon cylinder and cover of jar are made in one piece, and the cylinder in both is cleft for free diffusion of the sal-ammoniac solution. The other, the Laclede, is oval in form and has the only advantage of increased carbon surface. The connection with the binding post in both cases is made so as to render corrosion from capillary attraction as difficult as possible. The chief trouble from these cells has been from the careless handling after being set up, during which the liquid splashes up against the top and over the porcelain insulating the zinc.

The E. M. F. of all carbon cells without a depolarizer appear to be about the same between 1.3 and 1.4 volts. They quickly drop below this value with a current of .2 ampere, and the subsequent recovery shows little more than a single volt. Their most favorable point lies in the ease and cheapness with which they may be restored to nearly their initial efficiency after exhaustion.

With the large number of different types of batteries in the market to-day it is noticeable that, while on the alert to get a good battery as reasonable as possible, the consumer is not willing to buy in any considerable quantity batteries about which he is not familiar, without first having a test made of them, either an electrical test on a galvanometer or a practical test in service on the work upon which they are to be used.

ODDS AND ENDS.

Somebody has discovered that the telephone is teaching people the art of speaking distinctly.

A recent despatch from Berlin states that a German has succeeded in telephoning four miles over the rays of a searchlight. This ought not to be considered in the light of hot air.

The modern diver's helmet is equipped with a telephone. Divers for Wieland Bros., at Duluth, while working, seventy-five feet below the surface of the water, telephone their requirements to the wrecking barges above them.

A painstaking observer reports that the following item has appeared in at least 11,967 country papers during the past month: "The growth of the telephone business has been enormous in recent years. The statement has been made that there are now in use in the country upwards of 3,400,000 telephone instruments and that a great majority of these have been put in place during the past ten years. More than 200,000 telephones have been placed in farmhouses within a few years. The increase in farm telephones is proportionately greater than in any other branch of the business."

For the special purpose of giving warning in the event a fire should break out in the woods, a chain of fifty telephone stations completely surrounds the San Gabriel forest reserve in California. In addition to this precaution a patrol of twenty-five rangers is constantly on guard. The members of this patrol carry portable telephones with which in a sudden emergency they can cut in on the nearest wire, thereby saving valuable time which would otherwise be wasted in reaching the nearest station. The scheme is operated at heavy expense, but the reserve is owned by electrical and irrigation companies who control the water and wood facilities along the San Gabriel river, and feel that the expense is justifiable. Each of the telephone stations is supplied with fire fighting apparatus and the system is said to be as nearly perfect as it is possible to devise.

The following letter was received by a prominent telephone manufacturing concern and is reproduced to show that there is an amusing diversion for the manufacturer, occasionally. It is quite probable that manufacturers' letter files contain many amusing communications, but we doubt that any that are real or imaginative will surpass this one:

"Me and sum of my nabors wants to put in a telafone line from string town to rabbet ridge there are timber all the way and we would licke to no if yourn fones will work on trees we thought if your fone will on barb wire fence that it would do as well on the trees would it do to fasten the wire to the trees with fine stepels they say it will not do to have wire grounded do you grind yours how about your fones does you furmish short circuits with each fones some of the lines in this county have long metalec circusts but I have hearn some say that the short circust are better what kind of transmagraters and recepts do you put on your fones could I save any cost on my fone by using my dinner bell instead of 2 bells and that little flipper.

"Let me hear soon, Yours Truly"

DIGEST OF TELEPHONES AND KINDRED PATENTS

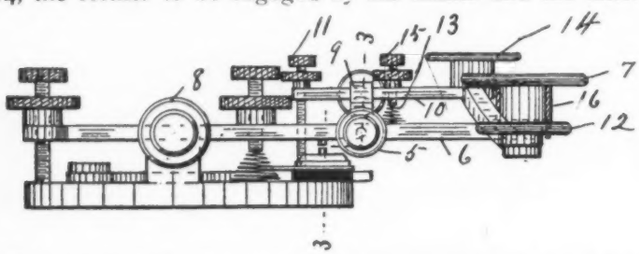
Conducted by EDWARD E. CLEMENT.

AUGUST 19.

707,312—J. E. Folsom, automatic circuit closer for telegraph keys.

This is an automatic device for keeping the line circuit closed, and is made either as a part of a special key, or as an attachment for any key.

Six is the lever of the ordinary telegraphic key; 7 is the button thereon, and 8 the pivot. An auxiliary lever 10 is pivoted at 9 on the main lever, and carries buttons 12 and 14, the former to be engaged by the thumb and the latter

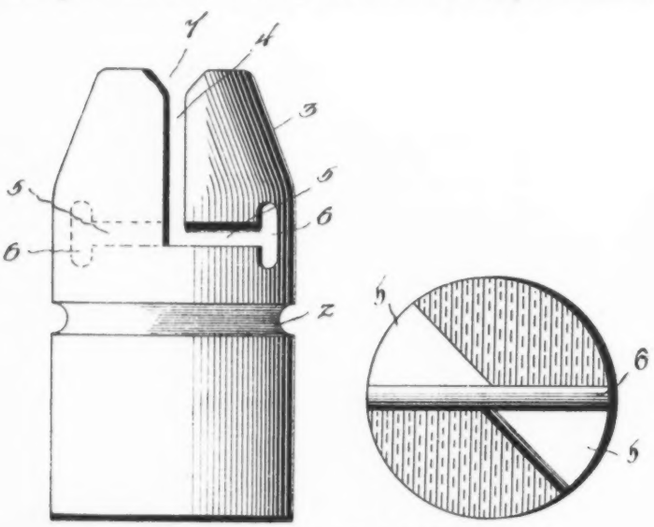


707,312.—AUTOMATIC CIRCUIT CLOSER FOR TELEGRAPH KEYS.

by the finger of the operator. The other end of the lever 10 carries a contact post 11, and the lever is normally tilted by a spring 13 so as to depress this post 11 and cause it to touch the ordinary circuit closing key, to close the line. When the operator places his fingers on the operating button 7 the circuit is opened by pressure on buttons 12 and 14, without conscious effort. It seems that telephone men have no corner on complicated solutions of simple problems.

707,429—Theodore F. King, insulator for electric wires.

This is an insulator which is supposed to hold a line wire in place without any tie wire. As shown, a slot 4 is formed in the body, extending down from the top, and lateral segmental slots 5-5 are formed at the bottom of this, so as to leave overhanging portions of the body on opposite sides. A hole 9 is made in the stem, into the threaded pin chamber.



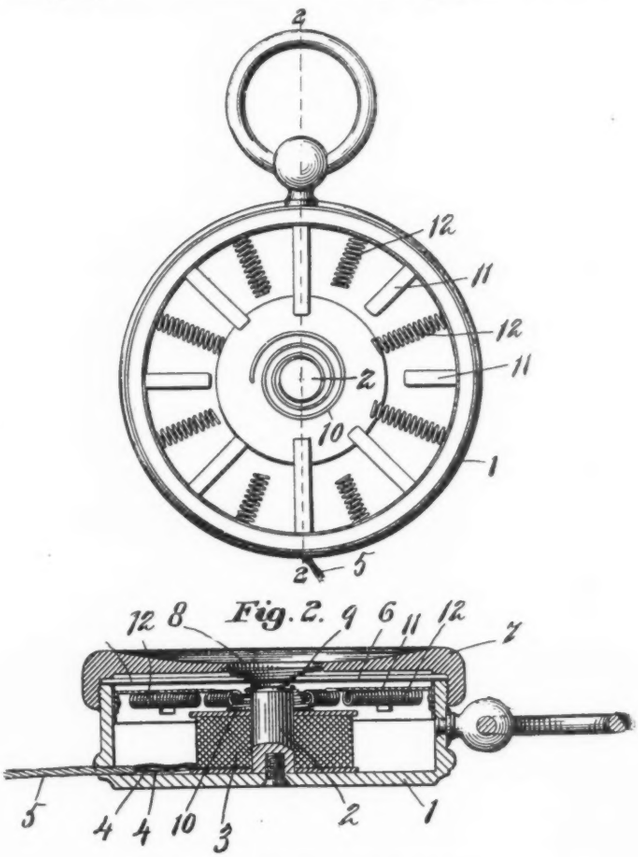
707,429.—INSULATOR FOR ELECTRIC WIRES.

In use the insulator is screwed nearly home on the pin, the line wire is dropped into the slot 4, and the insulator given a slight turn, so that the wire passes into cross slots 5, and finally rests in a groove, 6, upper or lower, according to the angle of the wire. A nail or screw is then driven through hole 9 into the pin to prevent any further turning.

The patentee does not say what he does on corner poles or curves.

707,441—L. Mellett, telephone receiver.

This is a receiver of the watch case pattern, having a steel cup 1, a single pole piece 2, and coil 3. There is nothing novel or singular about this. A diaphragm 11 of very thin stock is carried on the edge of the cup, but does not depend on its own resilience to resist the attractive force of the pole piece, being supported by two springs, 9 and 10, the former resting against the inner face of the cup 8, and the latter on the head of the coil 3. The edges of the diaphragm are not confined, as the cup is not screwed down upon them. Thus the whole diaphragm is supposed to vibrate freely, against the tension of the springs 9 and 10.



707,441.—TELEPHONE RECEIVER.

Under the diaphragm, and carried by the cup 1, are radial "harmonic vibrators," consisting of short rods 11 and helical springs 12, all pointing toward the pole piece 2, and having various lengths and tones. These are supposed to vibrate in sympathy with the diaphragm, and, aided by the resonance of the air chamber within the cup, to augment the volume of sound delivered to the listener's ear.

AUGUST 26.

707,557—C. M. Davis, telegraphic apparatus.

This is a device whereby a line upon which there are

"leaks" or partial grounds may be made to work well. It is of course well known that in telegraph and telephone practice grounded lines are less efficient than usual in their working, during storms, because of the leaks then established. While such leaks do not amount to really grounding a line, they interfere with the proper working of the apparatus. Thus, where terminal batteries are employed, on a series line, the leaks along the line may and sometimes do permit the passage of sufficient current to maintain relay armatures attracted, even though an intermediate station has opened the line at its key, to signal, and thus calls may be lost and signals distorted.

In the present case, the inventor provides means whereby, on any call being made, the battery or batteries may be entirely cut off, momentarily, so that, leak or no leak, there being no current, the armatures cannot stick up except through mechanical imperfections. The upper figure shows a line with terminal batteries, and a series of stations. A storm is prevailing along the entire line, the descending rain being indicated by slanting lines. Obviously, if the line be opened at any one of these stations, to signal, all armatures being normally attracted, and the magnetic effects therefore at maximum, a slight current to ground either side of the break will hold up the armatures.

In the lower figure the invention is illustrated. It consists essentially in the use of a sensitive line relay R^1, con-

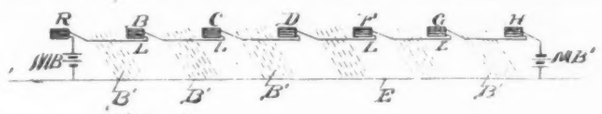
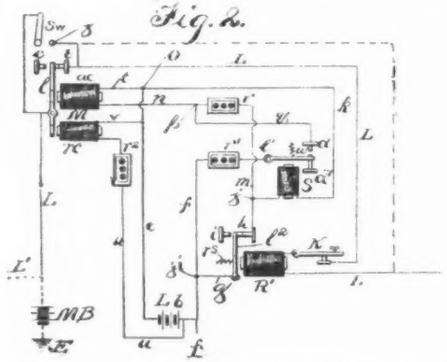


Fig. 2.



707,557.—TELEGRAPHIC APPARATUS.

trolling a balanced lever circuit closer, 1, so that when line current is diminished or ceases, armature l^2 will be retracted, and the lever 1 swung to cut off the battery MB. The lever 1 is worked by two magnets, rc and ac. The former is constantly energized, being included in a closed circuit with battery Lb, and adjustable resistance r^2. The latter magnet, ac, is connected on one side to battery Lb, and on the other through a sounder S to contact of relay R^1, and back to battery. The sounder armature closes on its back contact a shunt around the relay contacts h i, the shunt containing adjustable resistance r^1.

Magnet rc tends constantly to tilt lever 1 to cut off the battery. Magnet ac just suffices to overcome this tendency. When the line is broken, circuit of magnet ac is broken at the relay, and lever 1 is permitted to tilt. Almost immediately, however, armature l^1 of the sounder S, will fall back to close at d shunt p, q, d, l^1, r, f, and thus restore the circuit of ac, which will again pull the lever 1 over and reconnect the battery to line. Then when the calling station closes the circuit, current flowing therein causes relay R^1 to pull up its armature, sounder S does the same, and all the parts become normal.

707,761—A. B. Chance, circuit closing device.

This is a switchhook and circuit for signalling from a subscriber's station to central with centralized battery. The inventor takes a Holtzer-Cabot or Williams-Abbott switchhook and puts a pin 20 in the side near the escutcheon, and on the inside of the box fastens a vertical spring 19, with a cam plate 21 in position to be struck by the pin 20 as the hook goes up and down. (See Fig. 2.) A foot plate 18 is fastened so as to be touched by the end of the spring when it is forced over. When the hook goes up the pin 20 rides on the outside of the cam and shoves the spring back without making contact, but when the spring comes down the pin rides down the rear face inside the cam, and forces the spring forward to make contact between the spring 19 and the foot plate 18. The lever 3, and springs 9, 10 and 11 are connected in the primary and secondary circuits in the usual way, as the talking set uses local battery. In fact this device is intended particularly for use in magneto systems to make the signalling automatic. The metallic circuit 5-6 passes to central from the subscriber's station, and includes the contacts of the jack, the annunciator C and a

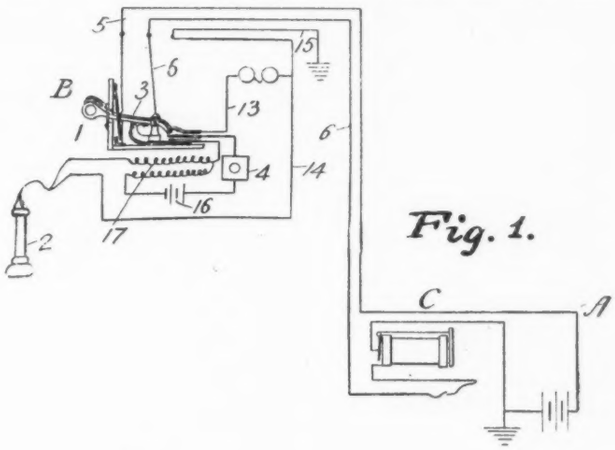


Fig. 1.

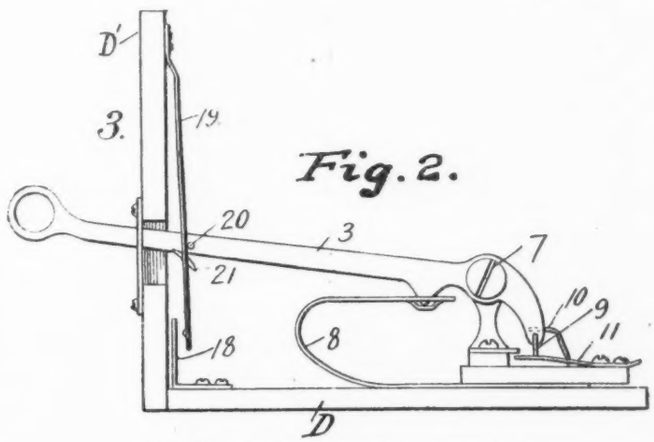


Fig. 2.

707,761.—CIRCUIT CLOSING DEVICE.

battery. The wire 6 goes to the hook lever 3, and the wire 5 goes to the foot-plate 18, so that the metallic circuit is used for signalling; but apparently, after providing this metallic circuit for signalling, the patentee is quite satisfied with a grounded circuit for talking, for he connects only the wire 6 to the talking set, with a ground wire 15. It is hardly fair to assume that a telephone man capable of producing an invention that is logically complete would make this mistake, and the invention of the inventor was probably the reverse; but attorneys are not always experts, especially in this art.

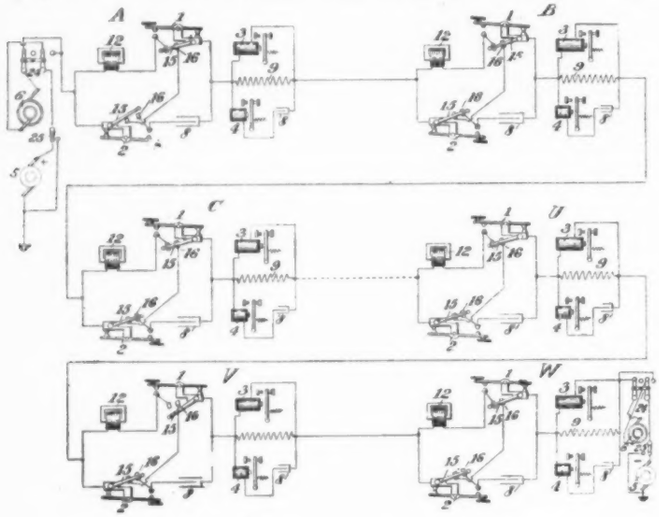
It would be quite possible to connect this device without any ground, by causing the switch 19, 20 to close a short circuit momentarily around the talking set.

707,829—A. C. Crehore, telegraphy.

The synchronagraph system of rapid telegraph transmis-

sion, the joint production of Professor Crehore and Mr. Squier, of the army, excited considerable interest a short time since. That we have not followed this and other important telegraphic developments in our digest columns has been only because of the volume of telephonic work, which, of course, takes first place. In the present issue we shall take up several important telegraph patents, and shall continue so to do as space permits.

The present case is of especial interest because the method employed for differentiating between the currents is substantially the same as that used in the old Van Rysselberghe combined telephone and telegraph systems. The



707,829.—TELEGRAPHY.

scheme is to duplex lines by using superposed current. That is, a direct current supply is used, with Morse key, or machine transmission, and also an alternating current supply, the employment of which is in accordance with the well-known principle of cutting out a wave or waves at intervals, either laying out a definite number of current waves for any certain code sign, or leaving one out at the beginning and end of the sign. In such cutting out of waves, the transmitting is usually done by a tape having perforations, and so moved under contact springs that the current is made or broken at the instant of zero potential. Very rapid work without discharges is thus possible.

In this patent a number of improvements are described. In the figure 6 is the alternator, and 5 the direct current generator, and the circuit is designed especially for the service of multiplied way stations, as B, C, U, V, etc. At each station a path through a choke coil 12 is provided for the direct current, and a path through a condenser 8 for the alternating currents. Keys are shown for signalling. At each station a circuit 3, 4, 8, 9 is employed for receiving. A system of interlocking keys is also employed, as shown, two independent switches being so arranged that neither can complete the short circuit around the apparatus unless the other is in position to close circuit.

There are five sheets, with eleven figures of drawing.

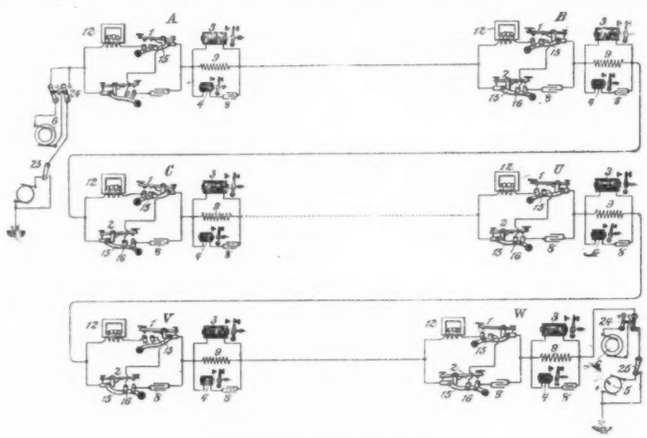
707,830—A. C. Crehore, telegraphy.

This case also relates to superposed current transmission wherein the capacity of the line is increased by transmitting one class or set of signals over said line by means of momentary currents of short duration and sharply defined or having a high rate of electromotive force change superposed upon currents having a slower rate of change and, generally speaking, of longer duration.

Telegraphs of this general class have never proved entirely satisfactory in operation, and a great source of difficulty has been the fact that the distributed capacity of the line has the effect of causing the pulsatory currents to decrease rapidly from the transmitting end or point where the source of pulsations is located to the receiving end of the line, and in order to maintain the necessary current at the receiver end for operating the receiver it is necessary to employ currents which become rapidly larger as the product of the resistance and the distributed capacity of the line increases; but if the pulsatory current exceeds a certain value there will be interference with the continuous-current relay on account of the proportion of total current passing therethrough. Moreover, the presence of the necessary condenser-shunts in such systems introduces another disturbing factor, because the larger the current the greater the reaction of the condenser and consequent tendency of the same to disturb the working of the other parts of the system. If there were no distributed capacity to the line, it would be possible by raising the voltage to produce the desired current at the distant end, and the current at the transmitting end would then be the same as at the receiving end, even though there are a large number of intermediate stations; but if there is distributed capacity along the line between each station, as in practice, this causes the transmitting-current to increase and the received current to decrease at a surprising rate, so that the maximum allowable current falls below the required limit.

One of the purposes of the present invention is to increase the limit of pulsatory current which it is permissible to use, thereby increasing the length of line or the number of stations which can be operated.

Another object is to make it possible to use smaller condensers than have hitherto been employed in systems of this character. In this way the addition of a large number of condensers to the Morse line will have less disturbing influence on the Morse working, while, moreover, the cost of equipment of the line is very considerably reduced. This freedom from disturbance is an especially important factor when the condenser in question is in the shunt around the Morse key, since the practicable limit of condenser capacity which may be used in this location without detection



707,830.—TELEGRAPHY.

by the operator through its disturbing effect is very small. Again, the ability to use a smaller condenser is of value in permitting currents of lower frequency to be used upon the line, and hence the system may be worked with less tendency to inductive disturbances upon neighboring lines.

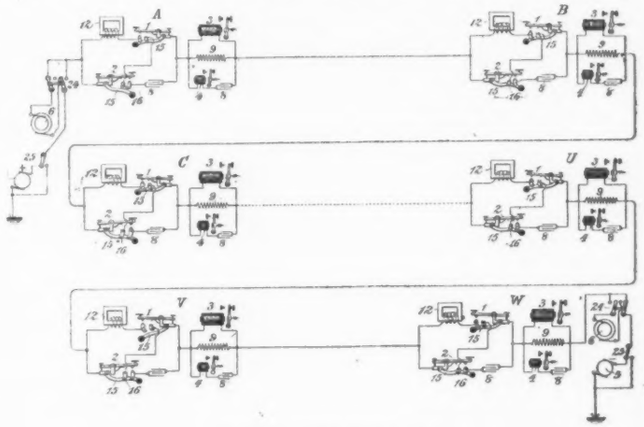
The invention consists, substantially, in employing for the pulsatory-current generator of a superposed-current telegraph one of a character adapted to generate a sine-wave electromotive force and in employing in conjunction with the pulsatory current of sine-wave form and in the various condenser-shunts used in the system a suitable value of inductance or reactance adapted to balance as near as may be the impedence of the condenser, as hereinafter described. Pulsatory systems as heretofore organized have generally employed pulsatory generators depending upon the making

and breaking of circuits containing induction-coils and batteries. The pulsations thus produced depart considerably from a sine wave, and hence the use in such systems of a balancing-coil or reactance would be of practically little good, since waves differing from a sine wave do not, either theoretically or practically, permit the impedance of the condenser to be balanced or reduced by the interposition of inductance. In practice the inductance which furnishes the reactance for balancing the reactance of the condenser may be afforded in some cases by coils of electromagnets employed for a receiving part of the system—as, for instance, by the coils for the pulsatory-current receiver—as would be the case where said receiver is in a condenser-shunt around the continuous-current receiver or other portion of the circuit having suitable inductance. In this case it is obvious that the receiver-coils will be preferably wound with the proper number of turns of wire to give them the necessary reactance. In other cases, as when the receiver for the pulsatory-current side of the system is in other relation to the circuit, a supplemental inductance or reactance balancing or counteracting the condenser-reactance would be used in the shunt-circuit with the condenser and whether said shunt be around the continuous-current receiver alone or the continuous-current transmitter alone, or both. It is difficult in practice to approximate the theoretical balance, because the theory neglects the losses which are necessarily involved when any coil is employed. The loss in the condenser is quite small and may be ordinarily neglected, and it might seem, given the problem of finding a coil to balance three microfarads at one hundred and fifty cycles, easy to find a coil which would reduce the condenser-shunt to a few ohms. To balance three microfarads at one hundred and fifty cycles requires an inductance of about .37 henries; but trials such as Prof. Crehore has made have resulted at the best in securing a condenser-shunt measuring not less than one hundred and ten ohms. In practice one hundred and twenty-five ohms will do, which is still a great advantage in the operation of the system over a shunt which with the condenser-line would be, say, three hundred and fifty-four ohms. The coils might be made by winding insulated wire in a coil of sufficient size to produce the required reactance without iron; but this would not be desirable, because the resistance of the coil and the amount of copper required would be too large. If the coil is wound upon an iron core, the size may be greatly reduced for the same reactance, and if the magnetic circuit of the core is completely closed by iron the largest reactance may be produced with a given quantity of iron and copper. The apparent resistance of such a coil for alternating currents is much greater than its ohmic resistance for direct currents and depends largely upon the amount of iron used.

For the purpose of a balancing reactance employed in a system of telegraphy in the manner above described it is desirable that the coils should maintain their values of apparent resistance and reactance as nearly constant as possible for all values of working current. Moreover, while furnishing the required fixed reactance to counterbalance the given condenser at a determined frequency they should also have a comparatively low apparent resistance. These conditions cannot all be satisfactorily attained in the forms of reactance just mentioned—for instance, the closed-magnetic-circuit type of coil does not maintain the apparent resistance and reactance for different values of working currents sufficiently constant in value. An inductance consisting of a coil wound on a straight iron core while it in a measure satisfies the requirement of constant resistance and reactance for all values of working current requires an undue amount of material. Prof. Crehore finds, however, that the disadvantages of one and the advantages of the other may be secured by using a coil wound upon an iron core whose magnetic circuit is practically closed, excepting for the presence of a small air-gap or interruption in the continuity of the iron core. Such a coil has the advantage that it may be used at all points on the line where current may sometimes be ten and sometimes one hundred milliampères, whereas if it were of the form in which the reactance would vary with the current it would be obvious that the balance for the condenser-reactance might be good at some points and bad at others.

707,958—A. C. Crehore, telegraphy.

This case covers the same sort of superposed current system as the last two, and claims a number of their features,



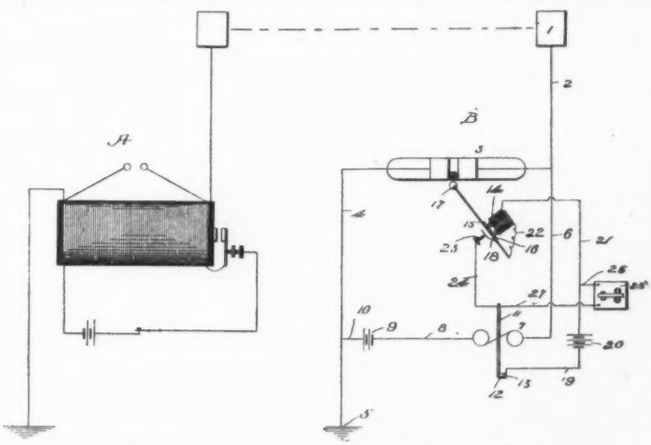
707,958.—TELEGRAPHY.

including the placing of the transmitters in parallel branches separate from the parallel branches 3 and 4 of the receivers.

SEPTEMBER 2.

708,071—G. W. Pickard, wireless telegraph system.

This is one of the numerous patents recently taken out for the Consolidated Wireless, of Philadelphia. It covers rather an interesting device. The coherer 3 is included as usual in the vertical ground wire 2-4, and responds to Herz waves picked up by the latter, lowering its resistance and working relay 7 in the local circuit 8, 9, 10, 4, 3, 7. This

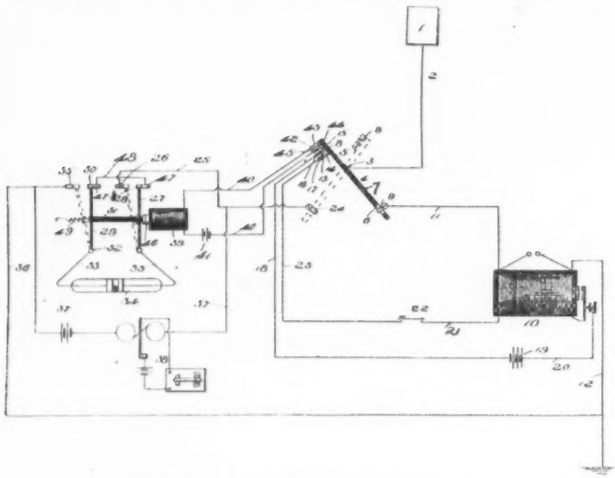


708,071.—WIRELESS TELEGRAPH SYSTEM.

relay has contacts 12, 13 included in the circuit 19, 21, 24 of the tapper 14, which, when energized, taps the coherer by its hammer 17, and causes it to decohere. The contacts 12-13 are of carbon, and every change in resistance of the coherer, by changing the strength of current in the relay circuit, changes the pressure between 12 and 13, thereby affecting the strength of current to the tapper, which will thus strike a blow proportioned exactly to the extent of coherence.

708,072—G. W. Pickard, wireless telephony.

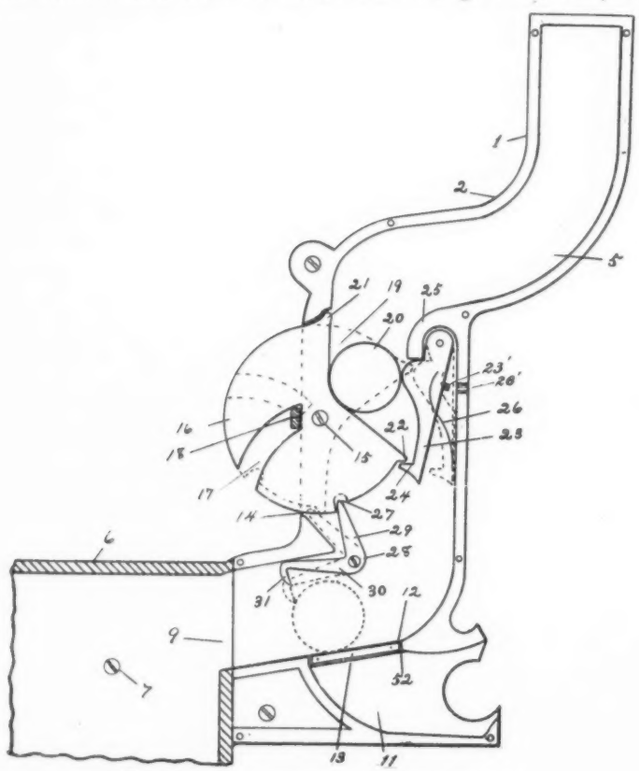
In this arrangement the usual vertical wire 2, coherer 34, relay 38, etc., with transmitter 10-22, are employed. The invention lies in the provision of a switch 7, which is moved to the right or left, as the case may be, to connect transmitter or receiver. On being so moved to connect the transmitter its upper end contacts close circuit 40 of a magnet 39 which works a switch to cut out and short circuit the coherer. Meddling, unauthorized use, and interference from local sending is thus all prevented.



708,072.—WIRELESS TELEPHONY.

708,138—S. P. Grey, coin controlled telephone.

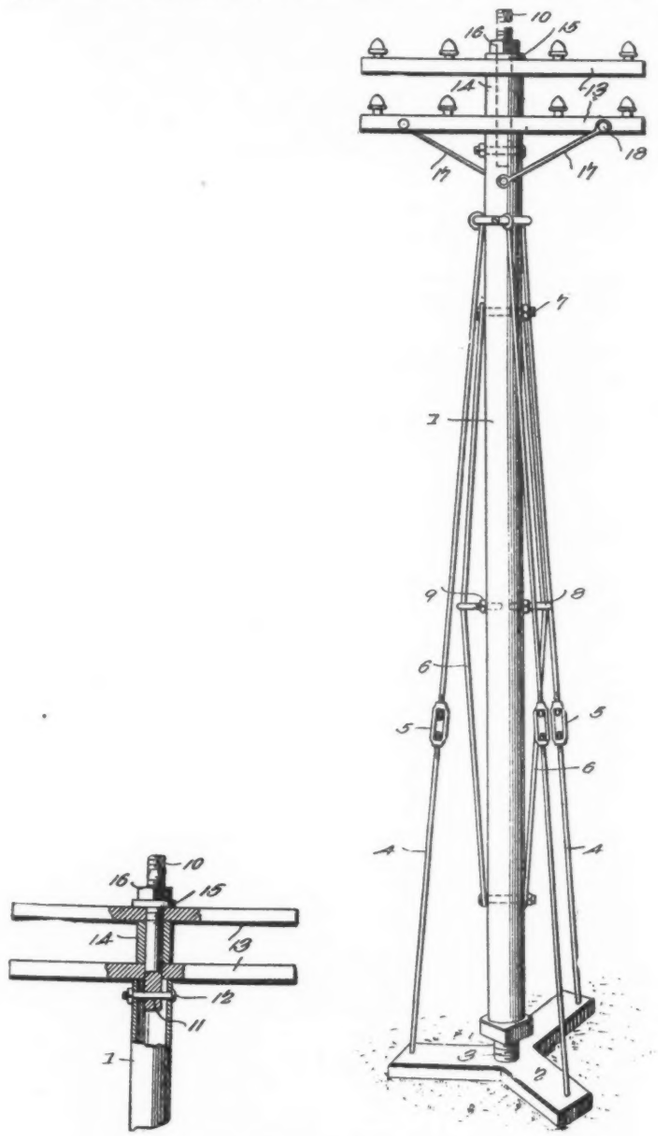
This is an improvement on a previous device of Mr. Grey's. The chute 1 is attached to the magnet box, and the switch hook lever 18 comes out through the slot 17 in disk 16. In order to let the hook go up for a call, the disk must obviously rotate, and this it cannot do until a coin 20 has been inserted, which will push back the pawl, 23, and release the disk. Then the hook goes up, but the coin stays as shown in dotted lines below, held by the bell crank detent 30, whose upper end lies in a notch 27 in the disk 16. When the phone is finally hung up, the detent 30 is lifted, and the coin is let pass into the box 9. If the desired connection cannot be obtained, the operator sends a current to line, which energizes a pair of magnets on the inside of the box door, and moves over slide 13, in the bottom of the chute, and lets the coin come out at 11 to be recovered by the depositor.



708,138.—COIN CONTROLLED TELEPHONE.

708,277—I. M. Warner, telephone or telegraph pole.

This is apparently the only complete portable telephone pole. It is stiffened by truss members 6, and carried like a Christmas tree on a stand 2, supported by a jack 3, and braced by braces 4, with turn buckles 5. The cross arms are secured at the top by a bolt 10, distance piece 14, and nut and washer 15-16.

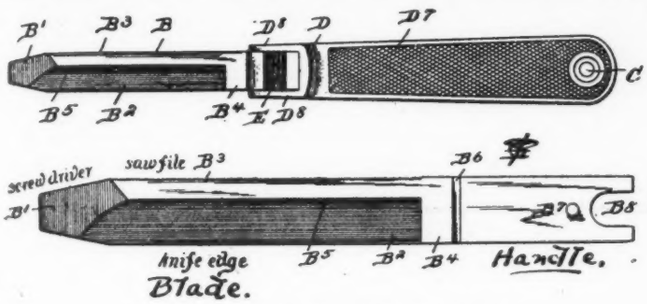


708,277.—TELEPHONE OR TELEGRAPH POLE.

SEPTEMBER 9.

708,639—I. W. Heysinger, tool for electricians.

This is a handy pocket tool for electricians. It is in the shape of a hollow handled jack knife, with sliding blade, B, having a saw back, screw driver end, and knife edge. The blade is normally held in by a spring end piece E, and by

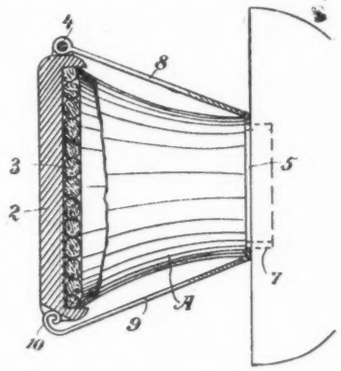


708,639.—TOOL FOR ELECTRICIANS.

holding the knife end down and running the thumb back over this, the blade slides out, ready for use.

708,671—H. C. Smith and M. H. Woolsey, antiseptic attachment for telephone mouthpieces.

A cap, 2, is hinged at 4, to a portion 8 of a one-piece stamping held on by the rubber mouthpiece screwing against

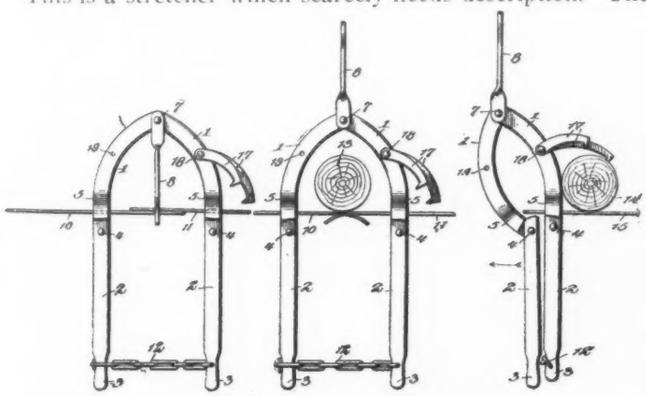


708,671.—ANTISEPTIC ATTACHMENT FOR TELEPHONE MOUTHPIECES.

it, and the cap latches in another portion 9 of the same stamping. The cap carries absorbent material 3, impregnated with antiseptic liquid. When the phone is not in use the cap is closed as shown, the fumes filling the mouthpiece.

708,706—A. J. Goldsby, wire stretcher.

This is a stretcher which scarcely needs description. The



708,706.—WIRE STRETCHER.

figure shows it in three positions—with and without a pole, on which there is no strain.

John Laskowski of Chicago spent twenty-five cents, a nickel at a time, trying to get a telephone connection with a slot machine. He was hungry and wanted to telephone for his breakfast. Failing in this he swore into the transmitter and was arrested and fined twenty dollars. Justice Dooley ruled that to telephone objectionable epithets constituted the offense of disorderly conduct.

OUT OF THE ORDINARY.

There are eighty-three distinct telephone companies operating 887 miles of lines in Linn county, Iowa, according to report.

It is claimed that the idea of establishing a telephone "newspaper" originated in Vienna, where several thousand clients subscribed to a central agency, which undertook to convey to them each day an eptomized version of the news.

A lockout system is needed on the rural line running north from Crawfordsville, Indiana. A farmer's wife telephoned to a sister twelve miles away that her only cat had died its ninth life. The next morning the complainant's yard was full of cats.

Van Antwerp's launch, "Telephone," illustrated in TELEPHONY last month, has a rival. W. C. Bacon of East Deerfield, Mass., has a launch, "Busy Moments," and the Greenfield telephone girls enjoy many delightful rides in it on the Connecticut river.

All the way from Copenhagen comes the intelligence that the Danish company which has been exploiting Poulsen's invention, known as the telegraphone, has refused $600,000 in good American money for a one-third interest in the invention. And along with the story we are advised that the haughty Dane received the offer coldly. Are we to infer that coal is cheaper over there?

Dayton, Ohio, citizens who require calling in the morning are able to arrange with a local telephone company who makes it part of its business to arouse the slumberer. Bells in the sleeping apartments ring according to schedule at a central office. The subscriber to this service stops his bell by turning off the current. The company guarantees to awaken anybody from any sleep but the last.

The bicycle cyclometer which has been perfected for the bicycle during the past few years has become quite indispensable as a device for recording telephone connections. The cyclometer is attached in an inconspicuous place on the switchboard and makes an accurate record, enabling the monitor to equalize the work of the operators. This wonderful little device is also used to record the calls in automatic switchboards.

Seventy thousand pounds sterling has been appropriated by the House of Commons to complete the system of coast communications for life-saving purposes in Great Britain. This service was begun in 1892 and has gradually been extended since that date. The system includes four hundred and ninety-two coast guard stations, three hundred and forty-nine of which are in England and Wales, thirty-six in Scotland, one hundred and seven in Ireland, and fifty-seven shore lighthouses. Telephones are extensively used in this elaborate aid to the life saving service.

In Germany, where the telephone service is conducted by the government, a certain association numbered among its members a prominent capitalist and had occasion to ask him by telephone whether or not be approved of a certain resolution which had been moved for adoption by his fellow members. The message was translated with the result that "resolution" became "revolution." An employe of the government service, with the instinct of a Sherlock Holmes, passed the message over to the secret police, who scented an anarchist plot and promptly arrested the sender of the message.

Telephony.

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INTERSTATE CONVENTION IN DECEMBER.

The executive committee of the Interstate Independent Telephone Association, comprising states of Illinois, Iowa, Indiana, Kentucky, Michigan, Minnesota, Ohio and Wisconsin, met at the Auditorium Annex, Chicago, September 9 and 10, to arrange for the program and date of the semi-annual meeting of the association. Nothing more definite than that the meeting will be held December 9, 10 and 11.

WITH OPEN DOORS.

It is a matter of considerable pride that the meetings of the National Association of Independent telephone men are held with open doors. There is nothing to conceal, nothing that the public should not know. To so openly court publicity is to inspire abiding confidence. To close the doors may and may not shut out alleged Bell spies, but it certainly shuts out the investor. Independent telephone men, imbued with the right spirit and actuated by high principles, do not have to "play to the gallery" during grave deliberations. To supply the local press with sensational declarations regarding the driving forth of alleged Bell spies, without indicating who they were, may be amusing to the malicious or the thoughtless, but to the thinking public it mirrors the incapability of an association to cope with public problems. No conference of Independent telephone men ever deliberated over questions more grave or more potent to the future welfare of Independent telephony than were discussed at the recent meeting held at the Auditorium on September 9 and 10. Yet those three meetings were held with open doors. The earnestness and sincerity that pervaded each session was ample evidence of the stability and permanency of the movement, and showed that the leaders were men of affairs with nothing to conceal, and that all their statements would bear full investigation by critical investors and an interested public.

TELEPHONE RATES MEMORANDA.

Under date of January 7, 1902, Mr. Edward B. Elliott, city electrician, submitted a report to the mayor and the council of the city of Chicago on the subject of adequate telephone service at reasonable rates, wherein he stated that "it would appear that no matter how low a rate was fixed for unlimited service, it would not be equitable for the large and small user. Some one must pay for the cost of and profit on each message, and under the present system of charging the small user must certainly pay for some of the service furnished to the large user. There seems to be only one remedy for this condition, and that is to fix a charge for which any one can obtain any amount of service under like conditions at a proportional charge per message. General business practice and experience would indicate that a charge for specific service could be fixed by considering the factors which constitute the cost of furnishing such service, and adding thereto a rate of profit that would be fair to the investor and not burdensome to the individual or general public."

Referring to a tabulation of rates charged in different cities, Mr. Elliott said: "The schedule of rates shows that competition and the reduction of rates for unlimited service have not secured to the public the desired results—an equitable rate for large and small users and perfect service at a reasonable cost. Neither do the results indicate that there is any economy yet secured or a remote possibility that telephone communication will be simplified or improved in any manner by which a user can obtain a small service and pay in proportion therefor."

Sir William H. Preece, the engineer in chief for the British postoffice system of telephony and telegraphy, testified in 1899, before the parliamentary committee investigating the subject of telephone rates, the increase in cost of supplying service to subscribers applies not only to the operating force in the exchange, but that "the cost of the mechanical work (that is, engineering and maintenance) will increase pro rata with the number of subscribers and the number of circuits; but this increased cost would not follow exactly the same rate of growth as the other one," and "that generally the cost to the company increases far more rapidly than the increase in proportion to the number of subscrib-

ers." Finally Mr. Preece said that "if the rental is too low and the subscribers too many the working expenses will exceed the rental, and rates will have to be increased; in fact, sir, that is a point that has already been raised on the continent, in Germany and in Switzerland."

In an important contribution to *La Nature,* dated January 26, 1895, M. Hospitalier, the well-known electrician, states that when the French government acquired possession of the telephone system in Paris the rate was reduced from $120 to $80, "and this reduction led to so rapid an increase of the number of subscribers that it became necessary to entirely modify the processes and the working apparatus in order to respond to the requirements, which it must be admitted exceeded the resources of the art." Discussing the cost to the company of supplying this service, he adds: "All the expenses sensibly increase as the square of the number of the subscribers, while the receipts, based upon a fixed rate, increase only proportionally. Sooner or later, and by the very force of circumstances, the price of $80 will become inadequate, and it will be necessary *either to increase it* or to make the budget support the deficit."

A writer in the International Bulletin of Electricity, Paris, of January 10, 1886, says: "Rates have not materially changed within the past three years, although the subject had often been discussed. It is in the most important cities —those having the most subscribers—that the maximum prices are attained; the reason for this is easy to understand. The advantage of the telephone naturally increases with the territory of the exchange and with the number of subscribers; communication by telephone saves more time when the distance over which such communications is held is greater, and the value of the subscription increases in proportion as the persons with whom we can communicate are more numerous. On the other hand, the larger exchanges are more costly to construct, and the operating expenses (the maintenance of the lines, for example) increase with the number of communications—that is to say, with the number of subscribers. For these different reasons it is logical that the subscriber in a large city obtains more advantages than one on a less important center. We do not, then, share the hope, which some persons entertain, of a reduction of rates in the future; we think, on the contrary, that they must be higher in time; this has been the actual experience in the United States."

NATIONAL ASSOCIATION CONFERENCE.

For the purpose of discussing topics of general importance to the Independent telephone movement and to secure closer relations between the different telephone associations, a conference was held September 9 and 10 at the Auditorium Annex in Chicago, called by the advisory board of the Independent Telephone Association of the United States. To this conference had been invited the officers and representatives of the national, interstate and various state associations, together with the Executive Committees of the National and Inter-state associations and representatives of manufacturing companies. Twelve state associations were represented at the conference in addition to the National and Inter-state associations, and there were about fifty persons in attendance. Without doubt closer union of action among the associations will prevail as a result of this meeting, which was harmonious and satisfactory in every way. Among those present were: James M. Thomas, Hugh Dougherty, J. B. Ware, H. D. Critchfield, S. E. Wayland, S. P. Sheerin, E. E. Webster, Henry S. Herr, R. F. Johnson, L. A. Goudy, Vinton A. Sears, Thos. E. Parmelee, C. H. Judson and Mrs. Annie M. Brett, representing the Independent Telephone Association of the United States of America; H. C. Raney, Dr. I. A. Lumpkin, E. M. Coleman, H. K. Cole, J. B. Ware, Chas. E. Hull and Geo. N. Bandy of the Inter-state Independent Telephone Association; Geo. W. Beers, Hugh Dougherty and S. P. Sheerin of the Indiana Mutual Telephone Association; G. A. Kienle of the Southern Indiana Telephone Association; U. S. Alderman, Henry S. Herr, H. C. Raney, J. S. Bellamy and Geo. N. Bandy of the Iowa Telephone Association; H. K. Cole of the Kentucky Telephone Association; L. A. Goudy of the Independent Telephone Association of Maine; J. B. Ware and R. F. Johnson of the Michigan Independent Telephone Association; E. E. Webster and C. H. Judson of the Minneapolis Independent Telephone Association; Thomas E. Parmelee of the Nebraska Independent Telephone Association; J. M. Thomas and H. D. Critchfield of the Ohio Independent Telephone Association, and J. B. Earle of the Texas, Oklahoma and Indian Territory Independent Telephone Association; besides Judges R. S. Taylor and W. J. Vesey of Fort Wayne, Ind.; Judge Payton F. Edwards, El Paso, Texas; Z. C. Campbell, San Antonio, Texas; Chas. A. Brown, Alfred Stromberg, A. J. Rosseau, E. B. Overshiner, J. G. Ihmsen, W. O. Meissner, S. A. Dinsmore, Henry Shafer, Geo. W. Conover and E. J. Yaxley, Chicago; Thos. Bromley, Alma, Mich.; I. E. Gardner, Bryan, Ohio; J. H. Parish, Madison, Wis.; Fred De Land, Pittsburg, Pa.; F. F. Sapp, Cleveland, Ohio; H. B. McMeal and Ed J. Mock, Chicago.

EQUITABLE TELEPHONE RATES.

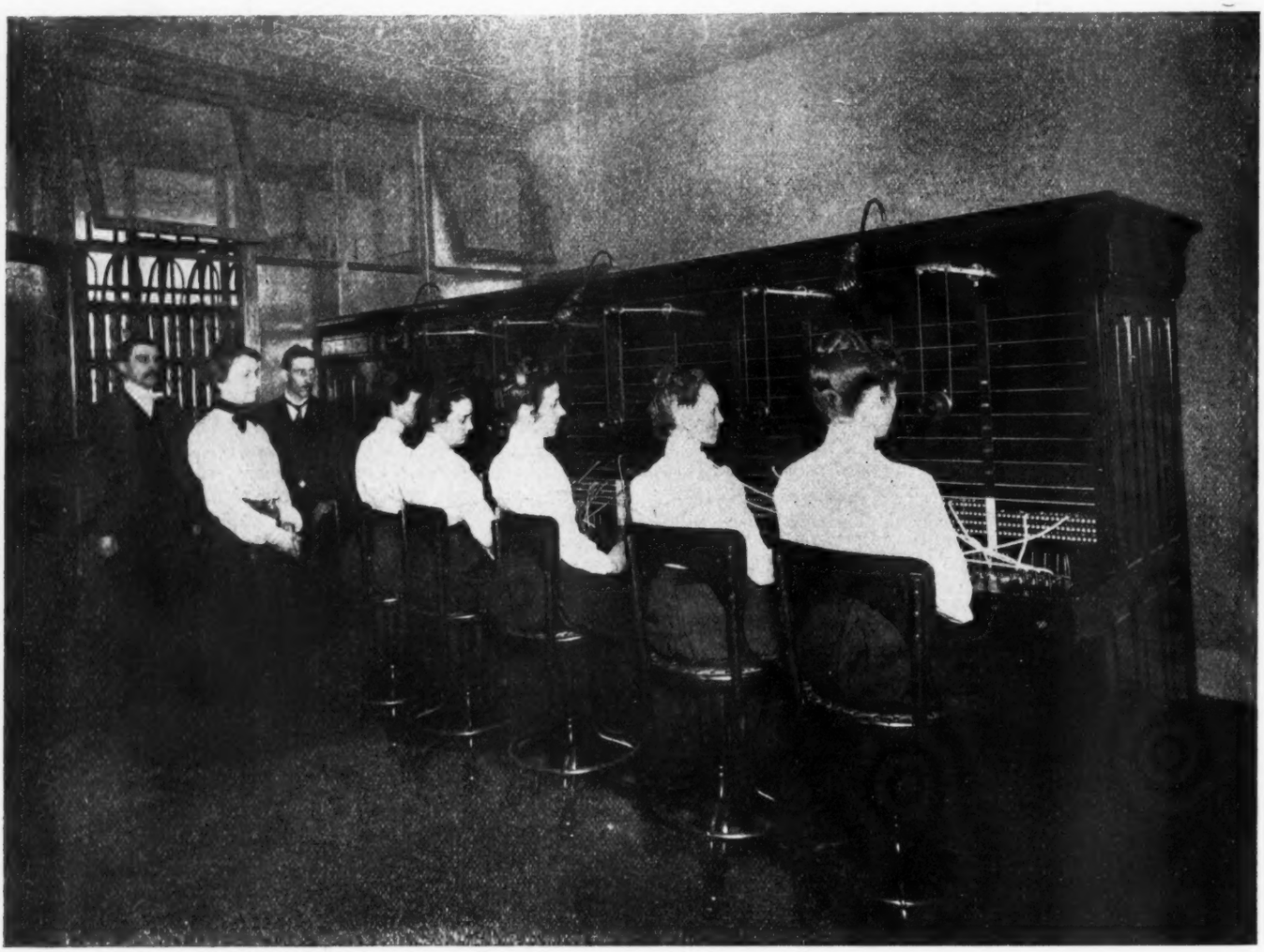
Where the flat-rate method of charging for telephone service prevails, there is some truth in the claim that the small user who calls but once or twice a day pays relatively far more for what service he receives, than does the larger user whose telephone is kept constantly busy. That is, one business man uses the telephone a hundred times more than the neighbor does, yet both pay the same monthly flat rate. If each paid for the number of calls respectively made, the smaller user would probably pay fifty per cent less per month and the large user one hundred per cent more. This is the method followed where the measured-service plan of charging has been introduced, and is in keeping with, but far more equitable than, the method in use in the postoffice, where a stipulated price is charged for each letter sent, whether the sender sends one letter or one thousand letters a day. For if the flat-rate works an injustice to the smaller user of telephone service, and the uniform method of charging two cents per letter regardless of the number of letters mailed, then the proper and equitable plan for charging is found in a modification of both plans, and that is what the measured-service system is based upon. The same investment and the same expensive organization and working force is requisite to provide prompt service for the small user though he calls but once a day. Hence, the plant must yield sufficient revenue to pay a fair return on that investment, as well as the cost of operation and maintenance and general expenses. So the measured-service rate is based on a price equitable to the small user, and then by decreasing the rate per call as the number of calls increases, a schedule of prices is obtained that is fair to the larger users.

Naturally, the small user of the telephone service, who has been paying more than his proportion under the flat-rate system, will welcome the introduction of the measured-rate, while the larger user, who has been getting his service at a price that was probably less than cost, will strenuously object to its introduction.

At the same time, in a measured-service rate lies the ultimate source of profit for Independent telephone companies. For many Independents are now appealing to their respective local councils for authority to increase the flat-rate, or to abrogate so much of the ordinance granting franchise right as imposes low, fixed flat-rates, for the reason that their respective exchanges do not yield sufficient revenue to properly operate and maintain growing exchanges.

Fox River Valley Telephone Company.

A description of the exchange of the Fox River Valley Telephone Company, located at Appleton, furnishes a striking example of what may be accomplished towards giving first-class telephone service when these three things are combined: Good engineering, good apparatus and efficient management. The exchange is located on College avenue in the center of the City. The company from the start has lived up to the motto: "The best is the cheapest" in telephone material. It began giving service January 1st, when it is said the Bell company had about four hundred subscribers, now having nearly two hundred, while the former has eight hundred working telephones with orders coming in quite rapidly for more.



MAIN SWITCHBOARD FOX RIVER VALLEY TELEPHONE COMPANY, APPLETON, WIS.

A conduit system extends over a major part of the town, while there is nearly 15,000 feet of aerial cable. The company has a great many toll lines, all of which are copper, which gives them connection with nearly one hundred and sixty small towns. Toll lines of best construction with hard drawn copper are being built from Appleton to Little Chute, Combined Locks, Kimberly and Kavkavna.

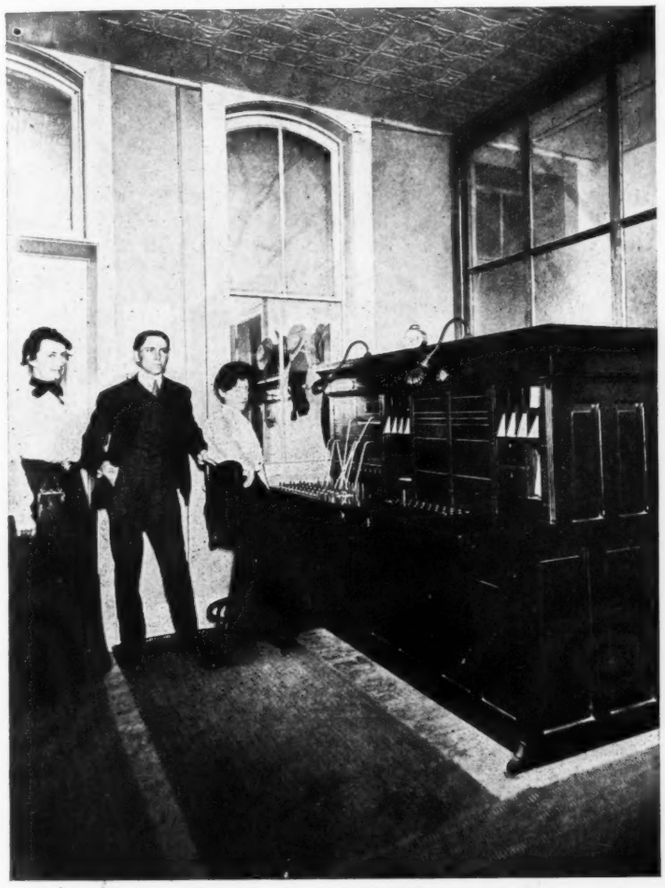
The president of the company, Mr. J. S. Van Nortwick, is also president of and largely interested in a number of pulp mills in the Fox River Valley district, and of the Green Bay and Mississippi Canal company. He also owns and controls many water privileges on the Fox River.

The treasurer and general manager of the company, Mr. John M. Baer, also treasurer of the Green Bay and Mississippi Canal company, is an ardent worker, ever ready to take hold of any project for the benefit of Appleton.

The superintendent, Mr. S. Von Almen, is a practical telephone man, having served considerable time as installer of exchanges of various sizes. He takes a great deal of pride in his work, and to him belongs a large share of credit for the condition of the plant.

The equipment of this exchange at the present time is only seven hundred and forty lines; however, the board has a capacity of 2,500 lines. The switchboard is not so remarkable for size as it is for its equipment. The system used is the common battery multiple relay, all batteries being located at the central office for talking as well as for signalling. The telephones used by the subscribers do not contain batteries or generators. The subscriber signals the exchange operator by simply taking his receiver off the hook, this operation lights a small incandescent lamp at the switchboard. In Fig. 1, which represents the front view of the switchboard, a number of rows of lamps are shown having the appearance of a row of pearls because the lamps are covered with jeweled lenses. Each time a lamp is lighted the operator inserts a plug into the jack located right above the lamp which connects her to the calling subscriber. After she has received the desired number from the calling subscriber she inserts a second plug, which is

connected to the first plug by a cord, into the multiple jack as shown in Fig. 1 in the second and third operator's position from the right.

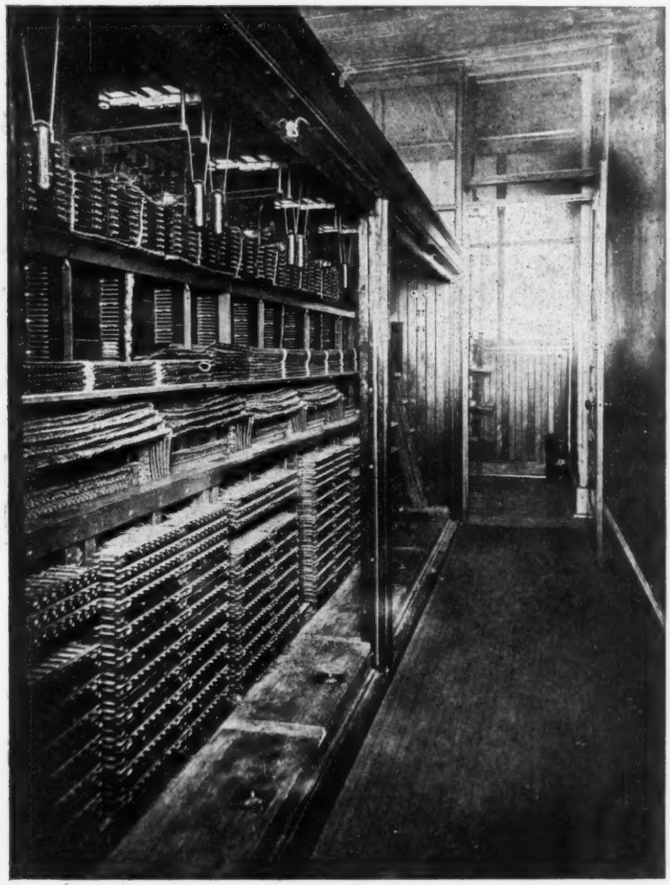


TOLL BOARD FOX RIVER VALLEY TELEPHONE COMPANY.

In this type of board each operator has all subscribers represented by multiple jacks in front of her so as to enable her to reach any subscriber in the exchange. It has been found that this is by far the best method of operating

SUPERINTENDENT.—FOX RIVER VALLEY TELEPHONE CO.

quickly. There are associated with each pair of plugs small lamps which serve for supervisory connections. As soon as the operator has inserted the second plug into the multiple jack of the called for subscriber, the supervisory lamp associated with the calling plug will light, indicating to the operator that the called for subscriber has his receiver still upon the hook. At the time of inserting the calling plug the operator rings the called for subscriber by means of a ringing key, and as long as the lamp associated with the calling plug remains lighted, she knows that the called for subscriber has not responded. As soon as he responds this lamp will be extinguished and the operator knows that the called for subscriber has answered the call. The supervisory lamp associated with the answering plug, i. e., with the plug the operator uses to insert into the jack above the lamp of the calling subscriber, does not need to light at the present, because the operator knows the calling subscriber is ready for conversation and waiting at his telephone. As soon, therefore, as the operator sees both lamps extinguished, and both plugs in the jacks, she knows that the



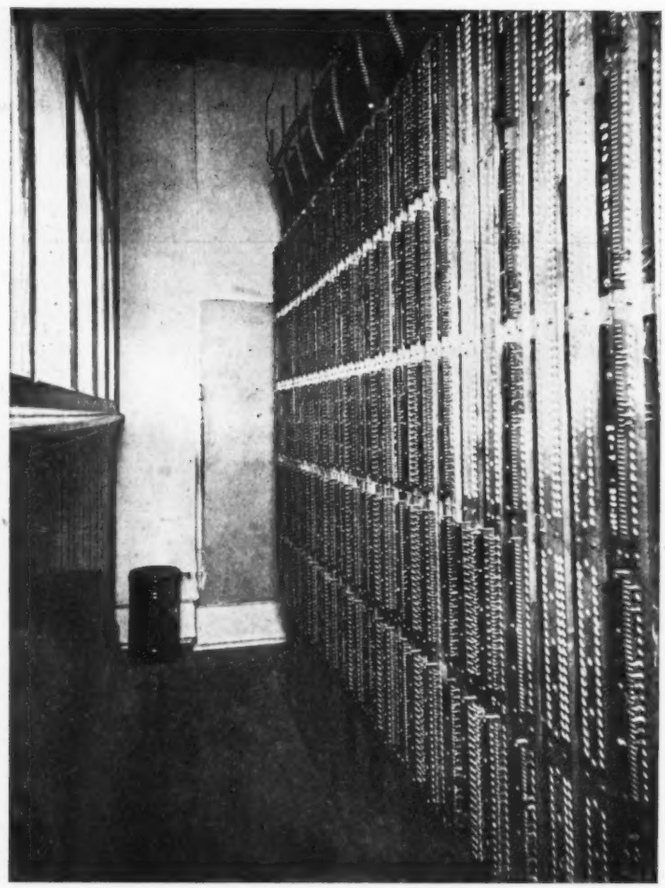
REAR OF SWITCHBOARD, FOX RIVER VALLEY TELEPHONE CO.

two subscribers are in conversation. Whenever one of the two subscribers hangs up his receiver, he lights the supervisory lamp associated with the plug that is inserted into his jack. When, therefore, both of the supervisory lamps are lighted, the operator knows that both subscribers have finished conversation and she can restore the plugs to their normal condition, or, in other words, take down the connections. It would not be sufficient to see one lamp lighted, as one of the subscribers may have temporarily hung up his receiver and left to obtain some information or other, intending to take up the conversation again.

The two-lamp supervision is the most modern and the only effective method of supervising a conversation. Arrangements are made so that any toll line or long distance line may be connected to any common battery local line or vice-versa; also that toll and long distance lines may be connected to toll and long distance lines.

In Fig. 2 is shown a two-position mahogany finished

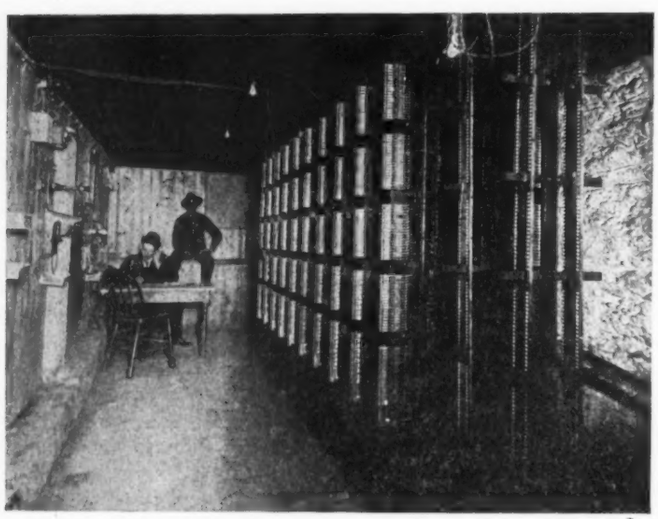
toll board for handling the toll business. The left end position only is equipped. This position has ten pairs of cords and plugs, twenty toll lines, five recording toll trunk



DISTRIBUTING BOARD, FOX RIVER VALLEY TELEPHONE CO.

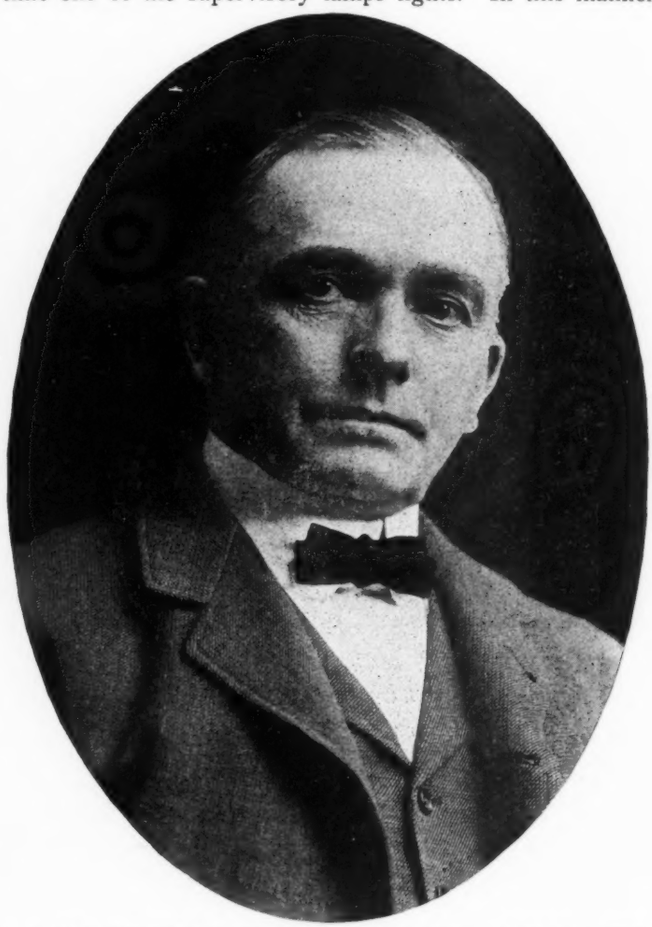
lines and ten incoming toll trunk lines. One order wire circuit is run from the toll board to the second regular operator's telephone set.

Fig. 3 represents the rear of the switchboard. In the



TERMINAL ROOM, FOX RIVER VALLEY TELEPHONE COMPANY.

lower part the relays are shown in banks. All the line, supervisory and cut-off relays are contained within the rear of the board. Above the relays the cables terminating at the jacks and lamps are shown, and above these the multiple cables all of which may be seen coming in at the right from the distributing frame. In the upper part of the switchboard a bank of condensers are shown, these condensers being used in the operator's cord equipment, and serve for transmission of the sound from one part of the circuit into the other. Above the condensers are shown such coils as are required for the operator's outfit to enable her to talk to the subscribers, also test relays to test whether the line of the called for subscriber is free. Above these are shown the power wires used in the lighting of the board. Each operator is provided with two pilot lamps, one of which is lighted every time the line lamp of a calling subscriber lights, and the other one is lighted every time one of the supervisory lamps lights. In this manner



J. S. VAN NORTWICK, PRESIDENT FOX RIVER VALLEY TELEPHONE COMPANY.

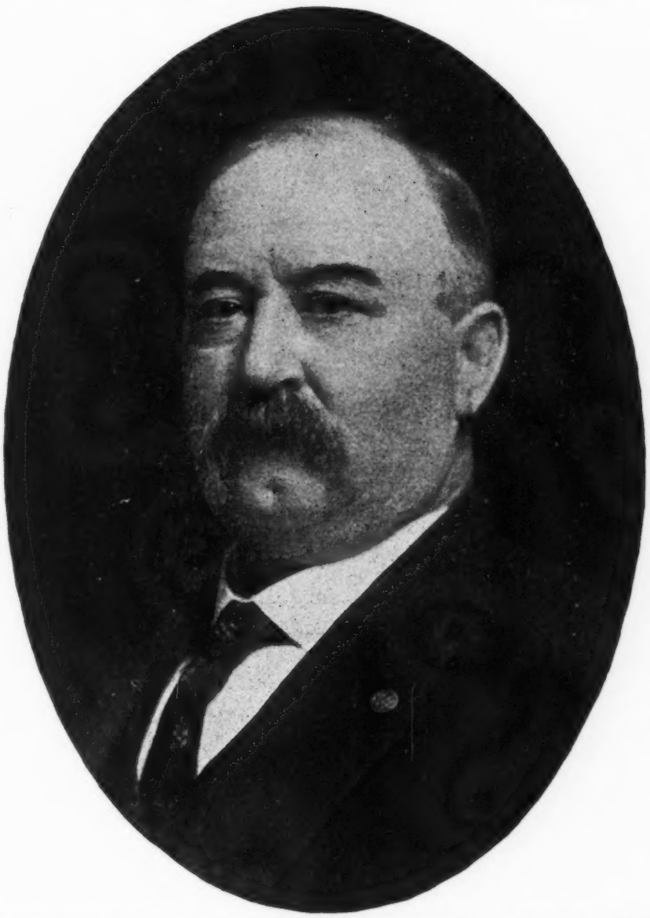
each operator knows by the lighting of the pilot lamp when the call came in or when the subscriber finishes talking. At night a night bell is inserted in this pilot circuit so that every time a pilot lamp lights the bell begins to ring.

Fig. 4 shows the combined main and intermediate distributing frame upon which the outside lines and switchboard lines terminate. It is desirable that the subscriber should always have the same number. In order to do this it is necessary to provide some means to enable one to connect any outside line to any jack in the switchboard; this is done at the distributing frame. On the side of the frame to which the outside lines and switchboard lines are brought, strips of connectors mounted on maplewood, are extended vertically the whole length of the frame, shown in Fig. 4. The connector strips are supported by small flat-iron bars fastened to the vertical angle iron.

All outside lines are brought in and soldered to permanent clips, and all switchboard lines are soldered to separate and adjacent clips. This gap is left to enable any line on

the outside to be connected to any line in the switchboard by running a so-called jumper wire between them. In order to keep these wires in systematic shape, rings are provided through which the wires are drawn. The frame is built so that all connectors are in plain sight and of easy access.

The distributing frame shown in Fig. 4 is made in two halves, one half being devoted to cross-connecting the lines that come in from the outside to the lines on the switchboard. The other half of the distributing board, which is not equipped at the present time, serves to distribute the load upon the operators. As it is not known at the beginning of operation which subscriber will call often and which will not, and as one operator may be burdened with a number of subscribers who call only a few times a day, it is



CAPT. JOHN M. BAER, TREASURER AND GENERAL MANAGER FOX RIVER VALLEY TELEPHONE COMPANY.

made possible by use of this distributing board to change over subscribers from one operator to the other, and thereby distribute the load upon the operators evenly. The principle of distribution of these lines on the intermediate distributing board is the same as on the main distributing board.

In Fig. 5 is shown the iron rack upon which is mounted sneak-current and lightning arrester equipment. This is located in the basement. A buzzer is wired in circuit with the sneak-current arresters, which sounds when any arrester is open.

The power machines consist of a motor generator, driven from the city light mains, the motor side having the voltage of the city mains, and the generator side being able to charge at twenty-four volts. Two storage batteries are provided of eleven cells each, these being located in the basement.

The central exchange was completely installed by the Kellogg Switchboard & Supply Company of Chicago.

The officers of this company deserve great credit for having provided the city of Appleton with good telephone service at moderate rates. That this is appreciated by the citizens is shown by the number of new subscribers which they are receiving daily.

THE SCARCITY OF PLATINUM.

If no new source is discovered, says "Public Opinion," the scarcity of platinum will soon be felt seriously in many industries. In view of the extensive use of this substance by manufacturers of telephones, switchboards and telephone appliances generally, its increasing scarcity and advancing cost is a matter of much moment to the makers of such apparatus at the present time.

The increased demand for platinum has not been met during late years by discoveries of new deposits. Platinum, first found in South America, was regarded as a variety of silver, hence the name from the Spanish plata-silver. It occurs as platinum dust in Colombia, Brazil, Hayti and Borneo, but the Ural region is the chief source of supply; annual output of the Ural mines being about 8,000 pounds, while the rest of the world furnishes only about 1,300 pounds. In 1895 the price per pound was $2,700, and in December of last year it had risen to $4,800 per pound.

As the mining of platinum has been developed almost entirely in Russia, a suspicion has arisen that the output is restricted purposely in order to enhance the price, but this supposition seems to be without foundation. The Russian government is now said to be contemplating the recall of coins minted before 1850, which contain platinum, for the purpose of reclaiming the metal. A considerable percentage of these coins, however, have disappeared from circulation, having been melted by chemists and technicians for the platinum which they contained.

A Boston photographer, found, after reaching New York, that he must communicate with his home office. After waiting twenty minutes for long distance connection, he found that Boston did not understand him. Central, in her persevering sweetness enjoined him to speak louder until his stentorian tones threatened to shatter the delicate diaphragm and he felt himself growing purple in the face. Central kindly admonished at this inopportune time to speak louder. "Talk louder," rejoined the photographer, "if I *could* talk any louder, I wouldn't need this confounded instrument!"

What is believed to be the largest cable in the world connects the telephone systems of Lancaster and York counties across the Susquehanna river at Chickies Rock, Pennsylvania. It is 3,200 feet long. The supporting poles are on high elevations above the river, the one being two hundred and seventy and the other one hundred feet above the water level.

Cleveland, Ohio, has a real estate broker who is suing the Cleveland Telephone Company for $10,000 because his name was omitted from the latest issued telephone directory. He bases his claim on the fact that he has lost a number of real estate sales through the company's failure to list him. Here is a new trouble for the proofreader.

The report emanates from Washington, D. C., probably not backed up by the census report, that one person in every forty has a telephone. Without due regard for the facts, San Francisco is credited with leading the world in the general use of the telephone, having one telephone for each twelve of its inhabitants.

Wartsberry, Washington, claims to have the largest barbed wire telephone system in the world. The system now aggregates approximately 400 miles. One central office connects all.

PERSONAL

G. B. Ortman is now associated with the Valley Construction Company at Rock Island, Illinois.

Elmer Brown has taken charge of the Brownstown Telephone Company's exchange at Houston, Indiana.

W. F. Ewing is now general manager of the Emporia, Kansas, Telephone Exchange, succeeding Howard Dunlap.

L. F. Hyneman, Lexington, Illinois, manager of the Home Telephone Company, visited Chicago on a business errand recently.

P. J. Hertz has accepted a position as traveling salesman with the Williams-Abbott Electric Company of Cleveland, Ohio.

S. A. Jones of Jones & Winter, Chicago, is at Paducah, Kentucky, overseeing the construction work for the People's Telephone Company.

W. T. Broeksmit has accepted the position of secretary and manager for the Independent Mutual Telephone Company of Shenandoah, Iowa.

William W. Libhard, Charlotte, Michigan, has been appointed manager of the Eaton County Telephone Company to succeed W. C. Osborne.

John F. McHugh, general counsel of the Sterling Electric Company, LaFayette, has just returned from a two weeks' trip to Ocean Grove.

R. H. Arthur has resigned the management of the Waterloo, South Dakota, Exchange. H. L. Hyde has been appointed Mr. Arthur's successor.

Geo. A. Rodomer and Miss Helen M. Sampson were married September 30th. Mr. Rodomer is a traveling representative of the American Electric Fuse Company.

N. D. Smith has relinquished his position as superintendent of the People's Telephone Company, Pittston, Pennsylvania, to accept a managerial position at Jackson, Tennessee.

R. C. Packard, president of the Columbia Construction Company of Toledo, Ohio, was a Chicago visitor en route to Ottawa, Illinois, where his company is constructing the Ottawa Home Telephone Company.

Clyde Dunseth, formerly with the Central Union Telephone Company, Terre Haute, has accepted a position as general manager of the Mineral Belt Telephone Company with headquarters at Joplin, Missouri.

The many admirers of Col. S. G. Booker will be glad to know that he has established offices at 405 Fullerton Building, St. Louis, and will act as manufacturers' agent, representing a large number of electrical houses.

W. J. Bell has resigned as manager of the Baraboo Telephone Company, Baraboo, Wisconsin, to devote his entire time to the affairs of the Bell Telephone Manufacturing Company's interests. Frank Horstman succeeds Mr. Bell.

T. L. Nolan, Henderson, Kentucky, has resigned management of the Henderson Telephone & Telegraph Company and will be succeeded by J. W. Walker, former manager of this exchange. Mr. Nolan moves to Louisiana, Missouri.

George G. Otis, Middletown, New York, has accepted the appointment of general manager of the Colonial Telephone Company of Newburgh. Mr. Otis has been actively engaged in electrical and telephone work for twenty-one years and is well qualified to superintend the practical work of any telephone exchange.

E. J. Richards, Chicago, has received the appointment as local manager for the Central Union Telephone Company at Rock Island, Illinois. Mr. Richard's duties will be devoted entirely to the management of the Rock Island exchange.

E. L. Hamlin has succeeded William Myers as manager for the Central Union Telephone Company at Canton. Mr. Myers retires after serving five years as manager of the Canton exchange, the company to provide a better position for him.

Mr. and Mrs. W. E. Doolittle and Mr. and Mrs. S. B. Fowler, La Fayette, Indiana, have returned from a two weeks' trip through Canada, the east and the Atlantic coast. Mr. Doolittle is president of the Sterling Electric Company and Mr. Fowler is the electrical engineer.

Charles P. Platte, of Kellogg Switchboard & Supply Company, Chicago, has returned from a six weeks' business trip to the Pacific slope. During Mr. Platte's absence from Chicago he visited Los Angeles, San Francisco, Portland, Seattle, Vancouver, Salt Lake City and Denver.

Francis M. Buck, vice-president of the Twin City Telephone Company, St. Paul and Minneapolis, will sever his connection with that company October 1. Business interests in Chicago requires his permanent residence here, but it is understood that he will retain his holdings in the Twin City concern.

Jas. S. Cuming, president and general manager of the Central Telephone and Electric Company, St. Louis, Missouri, accompanied by Charles E. White, visited Chicago recently, with the purpose in view to establish a branch office. Mr. White will have charge of the Chicago branch in the event the project materializes.

In the accompanying cut is shown TELEPHONY'S reception room. Reading from right to left those seated are George A. Briggs, president Chicago Telephone Supply Company; Frank G. Jones, president American Electric Fuse Company; Walter E. Doolittle, president Sterling Electric Company; R. C. Packard, vice-president and general manager Northern Construction Company; F. B. Patten, president Illinois Electric Specialty Company; F. F. Sapp, advertising manager North Electric Company, and H. B. McNeal, president Telephony Publishing Company. The gentlemen standing are George A. Rodormer and P. J. Hertz.

CASUAL VISITORS. TELEPHONY'S RECEPTION ROOM.

I am and have been a subscriber of ——— and other publications for the past two years, but consider TELEPHONY the best and most instructive magazine on telephone work that I have ever ran across. Can cheerfully recommend it to all of my friends and acquaintances in the telephone business.—EDW. C. HETZEL, Pittsburg, Pa.

Well-known Heads of Well-known Houses.

The Electric Appliance Company, Chicago, claims the distinction of being the largest electrical supply house in the United States. The company was founded in 1891 by Messrs. Willard W. Low and Thomas I. Stacey, president and secretary and treasurer of the company, respectively.

When the company began business at 242 Madison street it occupied the ground floor. Shortly afterwards it was compelled to utilize the first floor and basement and as the business grew the entire building was utilized. In 1898 the company moved to its present location, 92-94 West Van Buren street, where it occupies an entire building, which is five stories and basement. The company has one of the best arranged and modern edifices of its kind in the country, eighty thousand feet of floor space being occupied and the number of men employed in handling the business exceeding one hundred. The company's territory covers everything west of Pennsylvania, there being a traveling man in practically every western state of consequence. The company makes a specialty of telephones, switchboards and telephone supplies, having its own manufacturing plant for this line. Its publication, *Electrical Trade,* is issued in the interests of the company.

WILLARD W. LOW.

THOMAS I. STACEY.

The success of the Electric Appliance Company has been due mainly to the shrewdness and broad business policy of Messrs. Low and Stacey who have been in the electrical supply business for about seventeen years. Both of these gentlemen are well known in telephone and electric circles and their success is the culmination of years of hard, conscientious work. The telephone department of the company is managed by Mr. S. A. Dinsmore.

THE TELEPHONE IN CORSICA.

Ajaccio in Corsica, the birthplace of Napoleon, has a new telephone service. At present its subscribers are three in number.

Connections were made August 7 on the new telephone cable across Vineyard Sound between Vineyard Haven, Mass., and the mainland, and communication by telephone was established. The cable is four miles long, with terminals at Nobscot Lighthouse and Lamberton Cove, near Vineyard Haven.

It is one hundred and five miles between Sassnitz and Kolberg, Germany. This becomes quite important when it is learned that wireless telephone messages have been successfully transmitted between the towns named.

STRUCK HIM AS FUNNY.

"It took me an hour and a half to call up a man through the long distance telephone the other day."

"Wasn't it tiresome waiting?"

"Not at all. I amused myself reading the framed announcement: 'The mails are quick, the telegraph is quicker, but the long distance telephone is instantaneous, and you don't have to wait for an answer.'"

A cable dispatch from Berlin says that Ernst Ruhmer, the physicist, has invented a system of wireless telephony. His experiments have been successful over a distance of three miles. The invention acts on the principle of the transformation of light waves to sound waves by using a searchlight and a microphone.

MANUFACTURERS' SECTION

THE SELECTAPHONE.

A new device in the much-worked field of selective and lockout party line work is about to be put on the market by the Selectaphone Manufacturing Company, Wheeling, West Virginia. Although over six hundred patents have been granted on various party line schemes, this plan is a radical departure in this line of telephony. Heretofore all party lines designed for more than six stations have been variations of one general plan or method known as the step-by-step plan.

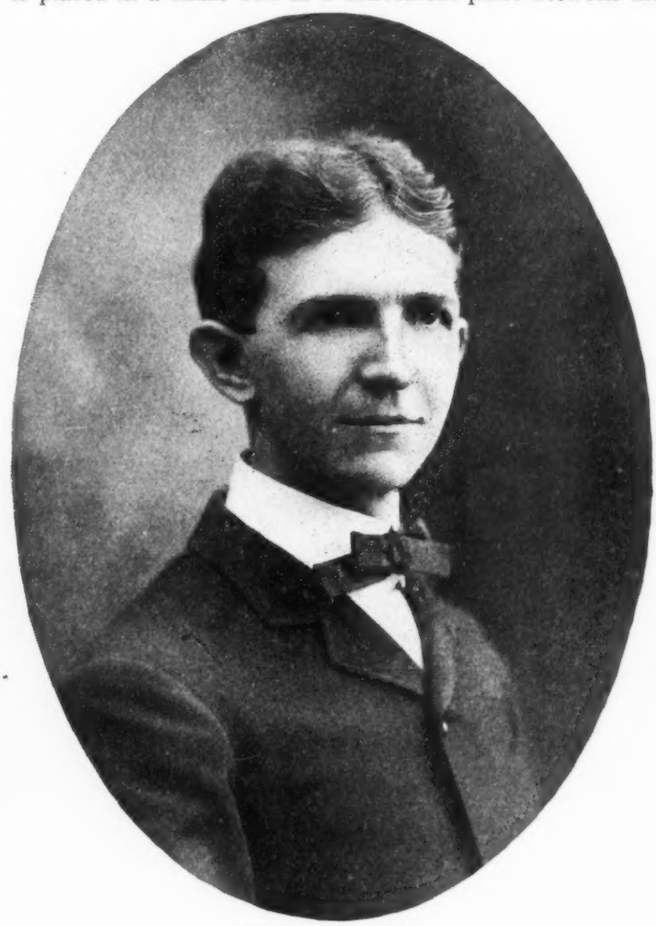
In this plan the line wires are continuous and step-by-step machines are used to throw the stations across the lines. The successful working of a line of this kind depends on the keeping of all these machines in unison, and keeping the contacts in good condition. The principle adopted by Messrs. Hall and Poole, the inventors of the selectaphone, is that of having one side of the line broken up into as many sections as there are stations on it. One side of the line is

FRANK B. HALL.

looped into each station and the loop is open at a switch in the Selectaphone at that station, so that when the line is in its normal condition central has a line to the first station only. By sending a current over this line she operates the Selectaphone at this first station and closes the open part of the loop there. She now has a line to the second station, and when the Selectaphone at that station operates she has a line to the third. By sending successive currents over the line she thus can build it up to any desired station.

The line thus built up is entirely clear and balanced. There are no magnets or other resistance to be talked through and it is entirely free from grounds. The subscribers both talk and ring metallic.

The Selectaphone, as will be seen from the illustrations, is placed in a small box in a convenient place between the



ARTHUR T. POOLE.

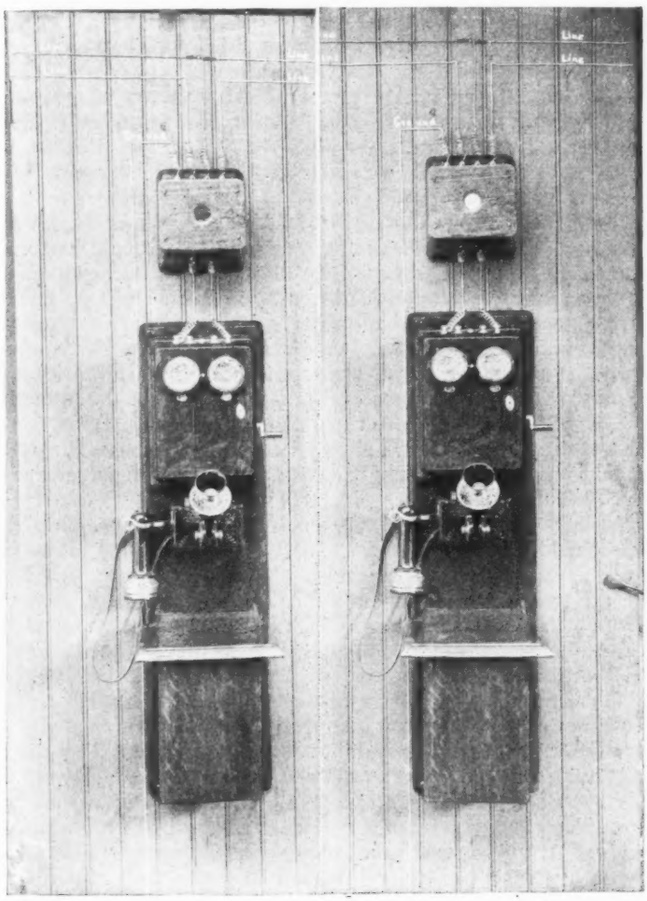
line and the telephone. It is entirely separate and distinct from the latter and can be used with any kind or make of telephone which will talk. It can be applied to lines now in use without altering the circuits of the telephones now on the lines. The only limit to the number of telephones which can be placed on a single pair of wires is the business of the line. One hundred can be placed on the same line if the subscribers will stand for it. Central rings the bell of only the subscriber wanted and as long as he has the line the rest can neither ring or listen. A busy signal on each Selectaphone is displayed when the line is in use. As soon as the persons talking ring off this signal disappears and the line is open for any one to call in.

One of the strongest features of the Selectaphone is the fact that a machine working at one station will work just as well at any other; that is, the machine at number two station will work at number six or number ten without any change at all. Another feature is the instantaneous lockout,

as soon as the line drop at central drops, or as soon as she inserts the plug in the line jack, every one on the line is locked out except the one calling in the first case or the one to be called in the second.

Another unique feature is the control central has over the line. She can, if she has any occasion to do so, take the line from a person using it and give it to another party on the same line. And she can do this regardless of the fact that the receiver of the first party is off the hook and he is making efforts to call in during the operation. In other party lines a man who leaves his receiver off the hook ties up the whole line. In this one the only person inconvenienced by such an act is the offender.

This feature also makes it practicable to have private subscribers on a toll line, for in case the line is needed for a



THE HALL AND POOLE SELECTAPHONE.

toll message the subscriber who may have the line can be made to get off it until the toll message goes through. Another application will be in a toll line which has several stations on it. Instead of getting the operators at these stations to connect up the line to the desired point, there may be a Selectaphone on the line at each station and they will build the line up to the station wished for.

While this line is designed to be operated on a clear circuit, it will stand a leak of 600 ohms from either side of the line to ground and an equal leak between the lines and still operate. This is more of a fault than a bridging line will stand.

The mechanism of the Selectaphone is very simple, consisting of two switches and two electro-magnets for controlling them. These switches consist of a small glass tube containing mercury, which closes the circuit between platinum electrodes sealed in the tube. The tube is exhausted of air and sealed, thus keeping the contacts in perfect condition. The Selectaphones will be sent out in sealed cases ready for connection to the line and the company will repair or replace any faulty machine returned with unbroken seals. This policy, in connection with the fact that any Selectaphone will work on any station, will make it an object for the exchange manager to have a few extra machines in stock, and in case of any trouble one of these surplus machines can replace the faulty one while it is being repaired or replaced at the factory.

Messrs. Hall and Poole have been working on this scheme for the past fifteen months and installed their first line for the Belmont County Telephone Company of Ohio in July. This line is about fourteen miles long and has ten stations on it. It has been working very well since installed and the Belmont County company expect to put a large number of these lines in operation. This line has been inspected by a number of telephone men and all have expressed the opinion that at last the party line problem has been solved. The only difference between service on this line and on a private line is the fact that a subscriber may have to wait before he can get a chance to use the line.

Of the inventors, Mr. Arthur T. Poole, vice-president of the Selectaphone Manufacturing Company, was born in 1872, and after a course in the high school entered Washington and Jefferson College, Washington, Pennsylvania, finishing his course there in 1891. He then was associated with his father in the jewelry busines in Washington, Pennsylvania, until 1894, when he entered Stanford University, California. After a course there, which included a summer spent in work at the Lick Observatory, Mt. Hamilton, California, he was graduated in 1896. In the fall of that year he accepted a position with John A. Brashear, the astronomical instrument maker, in Allegheny, Pennsylvania. This position he resigned to engage with his father at Washington, Pennsylvania, in the manufacture of an electric clock system. In 1900 Mr. Poole sold his clock patents to the Poole Clock Company, Wheeling, West Virginia, and since that time has been the superintendent of that company. Mr. Poole is a newcomer in the telephone field, all of his work previous to his association with Mr. Hall having been done in the line of electric clocks. He has had several patents issued to him on this subject.

Mr. Frank B. Hall was born at Rimersburg, Pennsylvania, May 19, 1861. He entered the telegraph field at the age of nineteen with the American Union Telegraph Company, which company soon after consolidated with the Western Union. From the Western Union Company Mr. Hall went to the Mutual Union Telegraph Company, remaining with it until it was purchased by the Western Union. He then started to work for the Central District and Printing Telegraph Company (Bell Licensee), Pittsburg, Pennsylvania, with which company he remained until 1899—a period of seventeen years. He was at that time district superintendent of construction, but resigned his position in July, 1899, and in October, 1900, accepted the position of engineer with the National Telephone Company, West Virginia (Independent), and immediately began the construction of its exchange at Wheeling, West Virginia.

Mr. Hall retired from this position January 1, 1902, and since that time has been making a specialty of cable work. He is the designer and manufacturer of the Hall terminal boxes.

In October, 1897, he founded the Mountain State Electrical Company, which was chartered August 24, 1900, with a capital of $50,000—the largest concern of its kind in the state.

Mr. Hall is one of the directors and general manager of the Selectaphone Manufacturing Company, just organized at Wheeling, West Virginia, to manufacture and market the device above described.

I am a blacksmith and engineer, but would not be without TELEPHONY for five times its subscription price.—F. G. BEHRE, Sumter, S. C.

TRADE NOTES

THE ILLINOIS ELECTRIC COMPANY make a specialty of supplying telephone companies with central energy power switchboards.

THE VOUGHT-BERGER COMPANY, La Crosse, Wisconsin, manufacturers of telephones and switchboards, has purchased the large plant formerly occupied by the Cooley Rug Company.

ATWATER KENT MANUFACTURING WORKS, Philadelphia, Pennsylvania, has issued a vest pocket folder presenting the advantages of the Monoplex telephone, which is free for the asking.

FRED M. LOCKE, Victor, New York, has issued a new catalogue illustrating and describing Victor insulators. No expense has been spared in the production of this catalogue, which is a marvel of perfection in every respect. The Locke spirit breathes in every page.

THE MONARCH TELEPHONE MANUFACTURING COMPANY, Chicago, is issuing a series of leaflets for the telephone buyer. Those already issued number from A25 to A35. The entire set will be sent upon request. The company reports a steadily increasing demand for Monarch apparatus.

THE INTERNATIONAL TELEPHONE MANUFACTURING COMPANY, Chicago, reports a steadily increasing demand for its special long distance transmitter. It is said that this instrument is designed and constructed along the most scientific lines and is one of the loudest, most durable and distinct transmitters ever produced.

L. M. NEHER, Milford, Indiana, is equipping a factory for the manufacture of telephones and telephone specialties. He will put on the market Royal telephones, Royal toll boards and the Royal anti-hummer. Other specialties will be added. This factory will cater to the rural trade and makes a specialty of building telephones.

THE NEW HAVEN NOVELTY MACHINE COMPANY, New Haven, Conn., is making a three way slideable sleeve branch not shown in its catalogue. This firm is meeting with pronounced success in the production of novelty slideable sleeves, Y branches and pot heads. A new novelty is promised for this month which will be of interest to telephone people.

THE ILLINOIS ELECTRIC SPECIALTY COMPANY, 170 East Madison street, Chicago, has issued a novelty folder suggesting that while "candle light seemed to fill the bill in our grandfathers' time," reproducing the candle as evidence, "the brightest and most reliable light is demanded to-day." The folder calls attention especially to the I. E. S. pole changer, with which the trade is familiar.

THE FISK-NEWHALL TELEPHONE MANUFACTURING COMPANY, Chicago, has found its present quarters at 171 South Canal street, inadequate for the handling of its rapidly increasing business, and is looking for larger quarters. The success of this company in the manufacture of telephones and switchboards has been remarkable, the company being in business less than six months. The apparatus manufactured is high grade and is meeting with marked favor. The switchboard recently built by this company for the Springfield Exchange is modern and efficient. Telephone managers visiting Chicago are requested to call on the company and inspect its complete line of telephone apparatus.

JAS. S. BARRON & CO., Broadway and Franklin streets, New York, is manufacturer's agent for Paul's Glitterene and Metal Pomade, which is claimed to be free from all mineral acids and substances injurious to delicate instruments. It is especially adapted for use by telephone inspectors for cleaning and polishing, having the qualities to remove stains from metals and polished surfaces. Ask for sheet 101 for full description.

THE EUREKA ELECTRIC COMPANY, Chicago, has just obtained contract from the city of Chicago for furnishing telephone apparatus for the fire alarm telephone service. This speaks very highly for the well-known Eureka apparaaus, being, we are informed, the first Independent apparatus to be used by the city of Chicago. In this contract it is claimed that the Eureka apparatus was selected after a competitive test with all the other leading makes on the market.

THE KELLOGG SWITCHBOARD AND SUPPLY COMPANY, Chicago, has closed a contract with the Keystone Telephone Company, Philadelphia, for two more common battery multiple relay switchboards of 4,800 lines capacity each, for their fifth and sixth district exchanges, respectively. Included in this contract is a chief operator's desk, wire chief's desk and manager's desk, all of which will be of mahogany to match the main switchboard; together with all necessary power apparatus, relay racks, distributing frames, lightning arresters and sneak-current apparatus. This will make a total ultimate equipment of 34,080 switchboard lines, which the Kellogg Company will have furnished the Keystone Telephone Company for its extensive system in Philadelphia.

THE FOLDING CABINET COMPANY, Lancaster, Pennsylvania, own the patents and are manufacturing the Altick Folding Telephone Cabinet. Owing to delay in securing foreign patents cuts of this ingenious cabinet are not available, but it promises a revolution in the telephone booth. The cabinet is constructed of hard wood with solid back. The outer shell or rolling portion is hinged together in such manner as to fold back compactly to within thirteen inches of the wall. Opening and closing is easily affected by means of rollers operating in tracks above and below. The cabinet is six feet four inches high and occupies flour space of 38x36 inches when closed. It receives light through a glass 21x16 in the top and another 36x7 in the upright side panel. One of the particular points claimed in favor of this cabinet is perfect ventilation and economy in floor space it occupies.

THE LAMBERT SCHMIDT TELEPHONE MANUFACTURING COMPANY was incorporated two years ago for the purpose of manufacturing exclusively telephones and switchboards. During this time it has been forging gradually ahead in the telephone field and is ready now to supply telephones and switchboards to either magneto call or central energy type for any size exchange.

It has introduced many new departures, both in telephones and switchboards and its apparatus is considered above criticism in every respect. In order to illustrate the high class work which it has undertaken, we are advised that the United States Army is using its apparatus practically exclusively, and the company refers any parties who wish for information on this subject to the United States Signal corps at Washington for verification.

The Lambert Schmidt Telephone Manufacturing Company is now installing for the Manhattan Railway Company, New York City, a complete six position, 500 capacity lamp signal multiple switchboard and telephones. The system is

common battery throughout, and many of the instruments will be located fully ten miles from the battery center.

The company particularly requests any parties in the market for telephone apparatus to communicate with it and every effort will be made to see that their wants are properly taken care of.

THE MANHATTAN ELECTRIC SUPPLY COMPANY, New York and Chicago, has issued illustrated catalogue and price list No. 14, which is one of the most complete and comprehensive electrical volumes of the year. More than seventeen hundred illustrations are shown and describing electric light, household, telephone, telegraph and railway electrical supplies, and it ought to prove invaluable as a supply guide to buyers. The "Mesco" trade mark, which has become familiar to all users of electrical supplies everywhere, is shown on many of the new goods manufactured by this aggressive company. Especial attention is invited to the combined fuseless cleat and rosette, and pony rosette. The catalogue is very interesting withal and concludes with nearly a dozen interior and exterior views of the company's plants. We understand that the catalogue is free to those who have use for it.

THE HAINES & NOYES CO., manufacturers of telephone apparatus, Chicago and New York, report the following sales during the past month: The McCoy Hotel, Chicago, large telephone system throughout the hotel; private telephone system for Marshall Field, Jr., new residence, Chicago; large private telephone system in the residence of David B. Jones, Chicago, consisting of flush telephones made up in special woods; system of fifty telephones and central energy switchboard for the Union Special Sewing Machine Co., Chicago; a 400-drop central energy board and telephone apparatus for East Aurora, N. Y.; a 300-drop central energy board and telephone apparatus for Hamburg, N. Y., as well as a number of smaller exchanges; a telephone system for the apartment building of Mr. Lockwood, Evanston, Ill.; a large shipment of telephones to Companie Industriale, Mexico; to the Electrical Construction Co., London, and to the Aurora Hospital, Aurora, Ill., through the M. B. Austen Electric Co., Chicago; one hotel system and one large office building system for Los Angeles, through the Woodill & Hulse Electric Co.; a large order of telephones for H. B. Lee, Buffalo, N. Y., for McDonald & Willson, Toronto, as well as several large private telephone plants for well-known factories. This is a splendid showing for the Haines & Noyes Co. Announcement is also made that the firm's September business has been the largest on record.

THE STERLING ELECTRIC COMPANY, La Fayette, Indiana, reports having in full and complete operation single relay, lamp signal, common battery multiple switchboards at the following points: Toledo, Ohio, 12,000 capacity; Wichita, Kansas, 4,000 capacity; Rockford, Illinois, 3,500 capacity; Peru, Indiana, 1,500 capacity; Galesburg, Illinois, 4,000 capacity; Lima, Ohio, 5,000 capacity; Marion, Ohio, 4,000 capacity, and Houston, Texas, 5,000 capacity. It is installing at the present time similar equipments at Loraine, Ohio, 3,000 capacity; Ironton, Ohio, 2,500 capacity, and Joplin, Missouri, 5,000 capacity. It has on its floor ready for installation similar equipment for Davenport, Iowa, 5,000 capacity; Freeport, Illinois, 3,000 capacity; Moline, Illinois, 3,000 capacity; Newark, Ohio, 3,000 capacity; Paris, Kentucky, 3,000 capacity; Rock Island, Illinois, 3,000 capacity; Terre Haute, Indiana, 2,000 capacity; Clarkesville, Tennessee, 3,000 capacity; Canton, Illinois, 2,000 capacity, and Cedar Rapids, Iowa, 5,000 capacity. The Sterling Electric Company reports an unusual demand for its distributing frames and protective devices, as well as its Standard Bell type boards, in addition to its common battery multiple boards. On account of the unprecedented demand for the Sterling apparatus, the Sterling Electric Company of La Fayette, Indiana, has found it necessary to to secure additional room and has purchased buildings giving 50,000 square feet of additional floor space, which will enable it to enlarge to an extent that it will be in position to accommodate all present demands for its apparatus.

LINEMAN'S TESTING SET WITH DE VEAU DIAMOND GRAIN TRANSMITTER.

This is said to be the lightest testing set made using a battery transmitter. Compact, durable and reliable. Full size, 8 inches long, 5¼ inches high, 6 inches wide. It is a complete telephone. The box contains magneto, buzzer, generator and two cells of exeter dry battery. On the cover is mounted a diamond grain transmitter, which is stationary. The transmitter is 2¼ inches in diameter and projects 1¼ inches from front surface of case. It is provided with flat mouthpiece and has no projections which may be in the way or liable to breakage. The receiver is held in a clamp and furnished with 18 inches of cord. The battery is cut in and the line cut out *automatically*, not manually, as in others on the market, by removing and replacing the receiver. This instrument will work any distance and is suitable for testing electric light, telegraph, telephone lines, cables and wiring in buildings. Can also be used as a field telephone. A handy and complete portable instrument. This style is now being used by trolley companies on their cars for quick communication. Manufactured and supplied to the trade by the De Veau Telephone Manufacturing Company, 27 Rose street, New York.

TELEPHONE SERVICE FOR CLAYPOOL HOTEL, INDIANAPOLIS.

The Claypool Hotel, Indianapolis, being constructed by the Indiana Hotel Company, will own and operate a complete telephone exchange, with a telephone in each room, parlors and offices. The hotel is one of the largest and when completed will be one of the finest and most modern equipped houses in the west. The building and the furnishings will represent an investment of more than a million dollars.

The telephone service will be under the direction of the hotel management, and will be entirely for the convenience of the guests. It is intended to connect the hotel system with the public city exchange, and state toll line system, so that long distance connection may be made from any part of the house.

The equipment will be furnished by the International Telephone Manufacturing Company, Chicago, and will embody all of the improvements in this line recently evolved by this company. The system will be a full central energy lamp signal, double supervisory switchboard equipment with strictly long distance telephones.

The switchboard cabinet work and the telephone woodwork will be of solid mahogany for the parlor floors, of white walnut for the ladies' parlors, and match the fittings throughout the house. The working parts of the system will have the same grade of work as is in this company's public exchange equipment, and it is expected it will be one of the most modern and efficient hotel telephone systems that has ever been installed.

Farr Telephone Construction Supply Company.

The Farr Telephone and Construction Supply Company was organized in 1895 by Charles W. Farr with offices at

HEADQUARTERS.—FARR TELEPHONE & CONSTRUCTION SUPPLY CO.

84 La Salle street, Chicago. The company was incorporated in 1896 under the laws of the state of Illinois, with

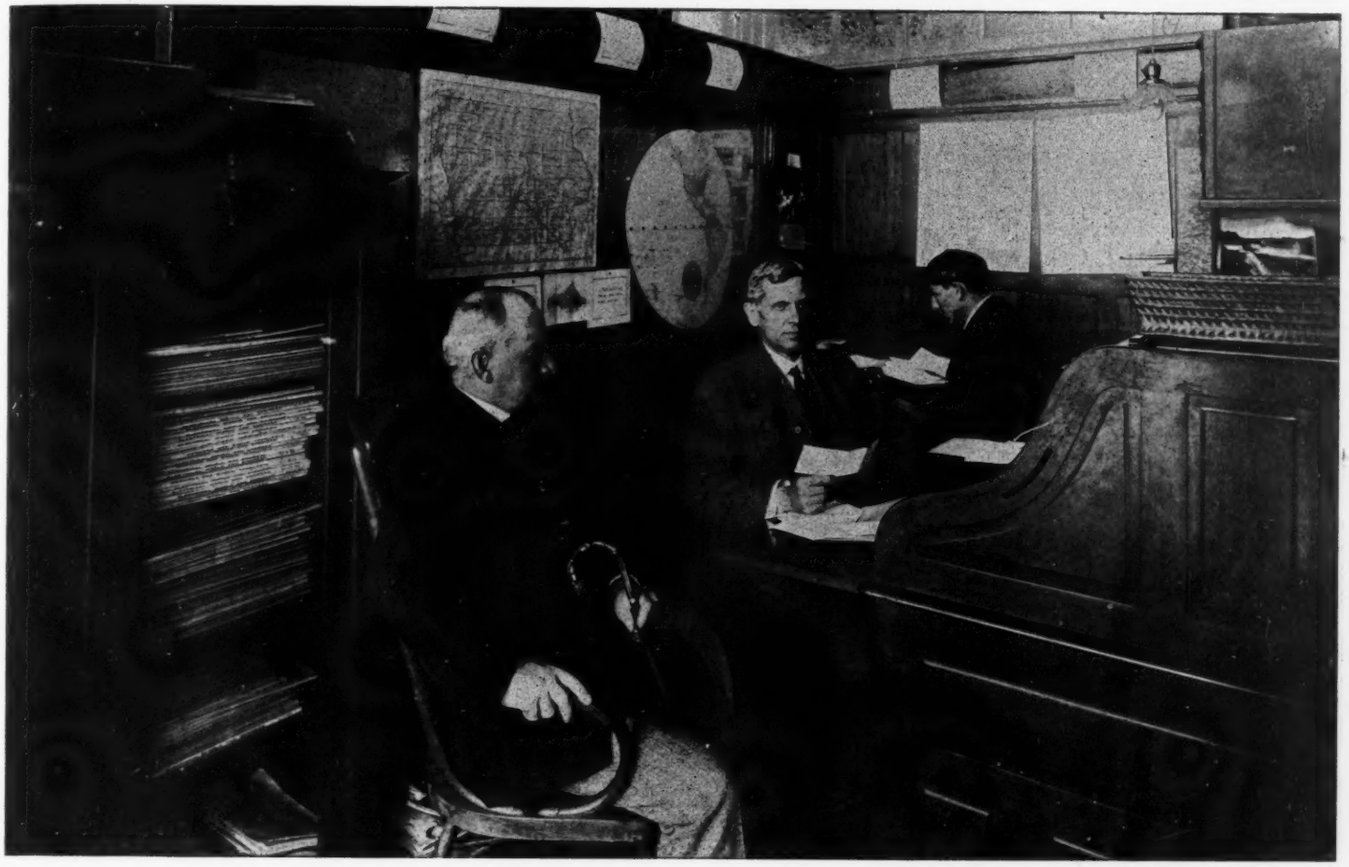
CHARLES W. FARR.

Charles W. Farr as president, N. B. Farr vice-president, E. W. Hurst general manager, and R. J. Cram secretary and treasurer, and through the able management of Messrs. Farr and Hurst the business was very successful. Larger quarters were required and the company removed to 342 Dearborn street. In 1897 it was again found necessary to secure more room and the business was removed to 357 Dearborn street. In 1891 the company removed to its present quarters, 118-120 West Jackson boulevard, where it has ample facilities to take care of its many customers. The company's business now exceeds two hundred thousand dollars per year and its trade covers every state and territory in the United States. The success of the Farr Company has been brought about through conservative methods, honest dealing, and a rule to satisfy customers or refund the money. The company does not employ traveling men, its business being done entirely by mail. Many thou-

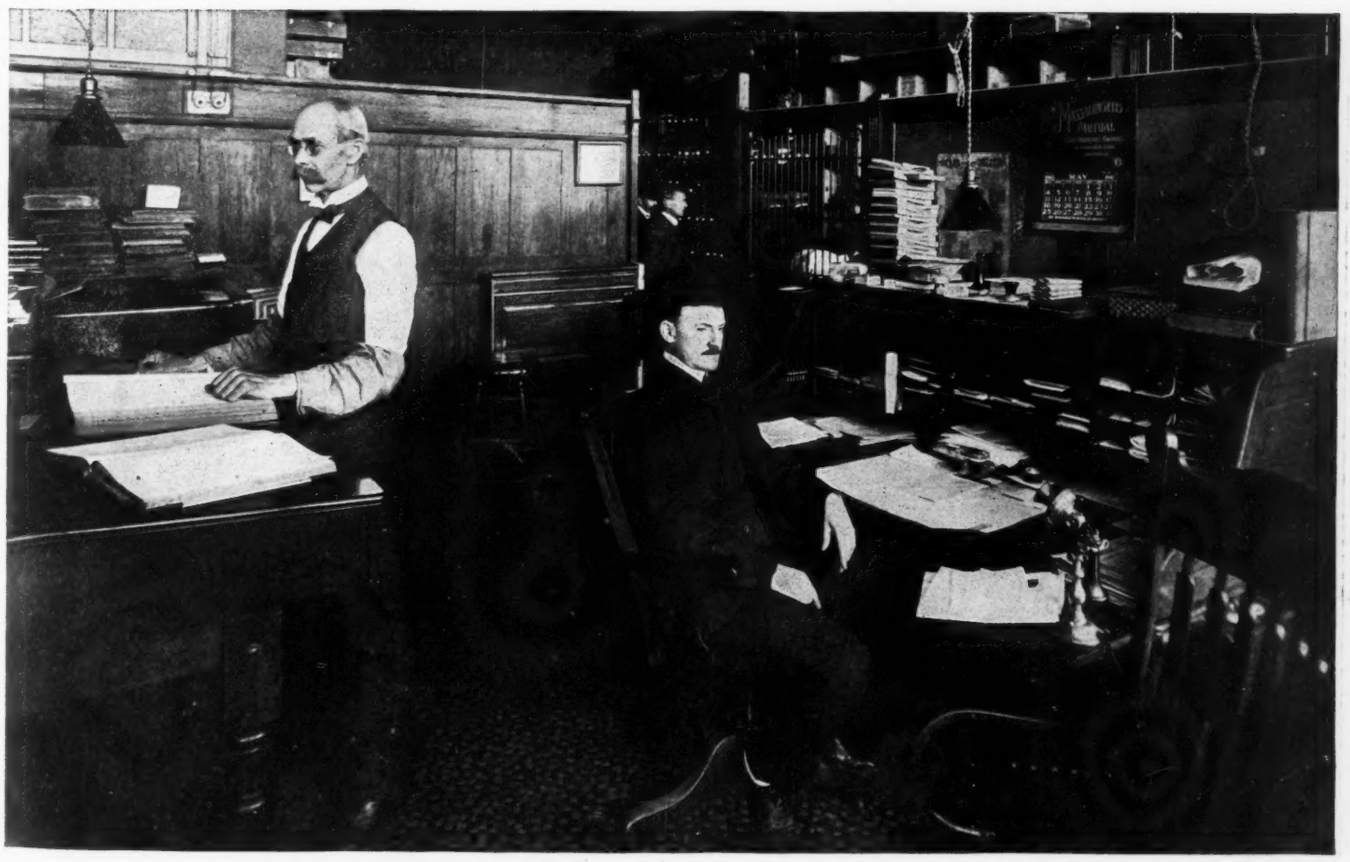
E. W. HURST.

sand catalogues and bulletins are sent out yearly, and the advertising columns of the best journals have been freely used, which method has been a great factor in building the company's business, which embraces the manufacturing of telephones and telephone apparatus and the wholesaling of telephone supplies and construction material.

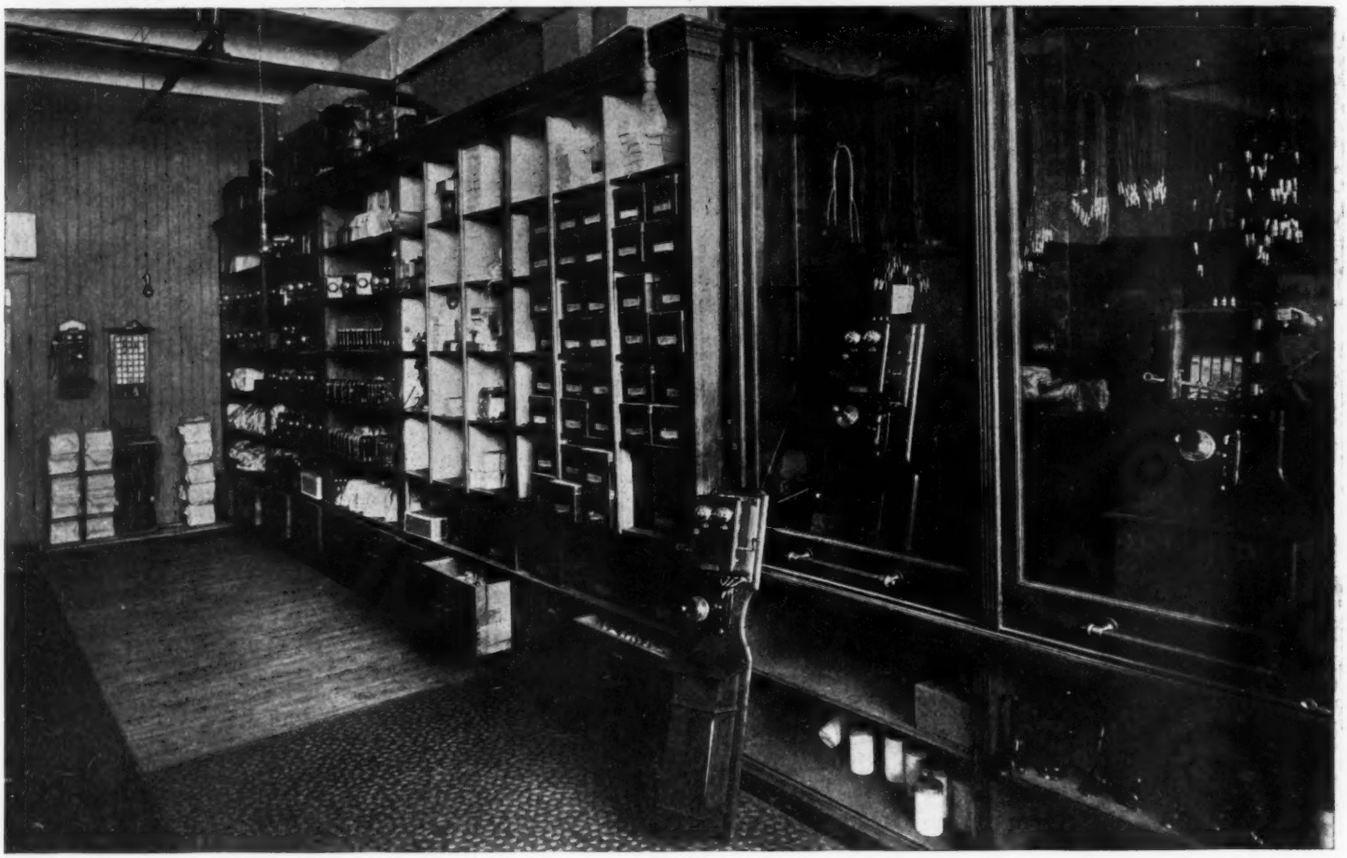
Portraits of the company's president, Charles W. Farr, and the general manager, E. W. Hurst, are shown on this page, as well as a cut of the building in which the Farr Telephone and Construction Supply Company has its offices and factory. On the pages following are shown views in the company's offices, as well as a view of the telephone assembling room and the packing room. The company invites correspondence from prospective buyers, and will send catalogues and printed matter illustrating and describing its complete line of telephone apparatus, exchange supplies and construction material.



PRESIDENT'S OFFICE, FARR TELEPHONE & CONSTRUCTION SUPPLY CO., CHICAGO.



GENERAL MANAGER'S OFFICE.—FARR TELEPHONE & CONSTRUCTION SUPPLY CO., CHICAGO.



SALESROOM.—FARR TELEPHONE & CONSTRUCTION SUPPLY CO., CHICAGO.

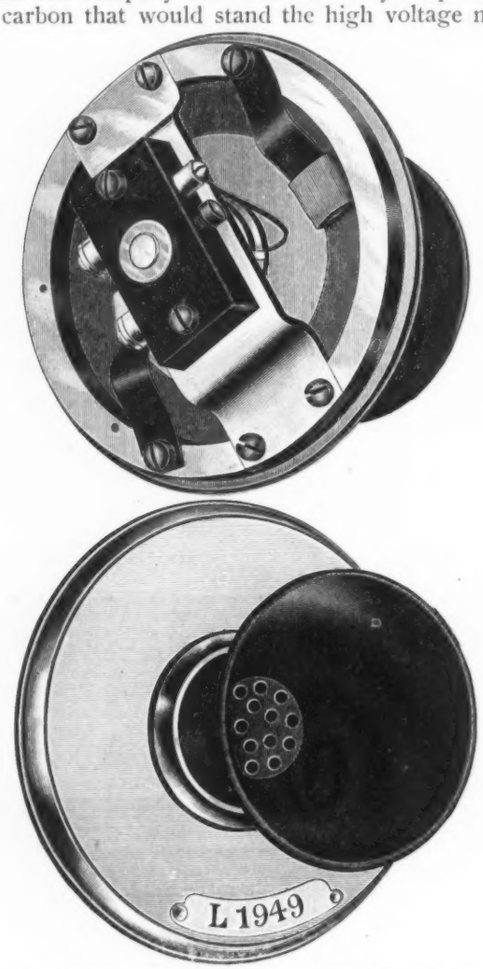
MANAGER CATALOGUE DEPARTMENT.—FARR TELEPHONE & CONSTRUCTION SUPPLY CO. CHICAGO.

ASSEMBLY ROOM.—FARR TELEPHONE & CONSTRUCTION SUPPLY CO., CHICAGO.

PACKING ROOM.—FARR TELEPHONE & CONSTRUCTION SUPPLY CO., CHICAGO.

THE MONARCH TRANSMITTER.

The transmitter recently put on the market by the Monarch Telephone Manufacturing Company, Chicago, is of the White solid back type, the same as used by the Bell company, to which is added a number of Monarch improvements. This transmitter has gone through a long experimental stage and every known defect in the transmitter has been eliminated. Among the special features is a heavy turned solid brass front with rigid bridge for holding the carbon cell so as to confine the vibration absolutely to the diaphragm. After experimenting with the various makes of carbon the company found it necessary in producing a special carbon that would stand the high voltage met with



MONARCH SOLID BACK TYPE TRANSMITTER.

in common battery work, to install a complete set of special machinery and furnaces for the purpose of manufacturing its own granular carbon and electrodes. The electrodes are arranged in such manner that the entire cell comes under the influence of the diaphragm vibrations, thus preventing any possibility of packing. Mica insulation is employed entirely in the construction of the carbon cell and no acid or solder is used in the mounting of the carbon electrodes. Special attention has been given to all parts of the transmitter to have the same ratio of contraction and expansion. Both terminals are taken from binding posts mounted on a hard rubber block in such manner that there is no electrical connection with the outside shell.

An ingenious device has been designed by which the transmitter can be mounted on any make of arm, making it convenient for the replacing of unsatisfactory transmitters. This transmitter is made in two distinct types for common battery or local battery instruments, but with no difference in the mechanical construction. In the common battery type the granular carbon and carbon electrodes are subjected to a chemical treatment that in addition to the high polish makes them extremely hard and enables them to withstand the necessary high voltage current without disintegration. With the completion of this transmitter the Monarch company now has a complete line of the component parts of the telephone.

THE DEVELOPMENT OF THE AUTOMATIC IDEA IN TELEPHONY.

The Independent telephone field furnishes so many instances of phenomenal growth in an almost incredibly short time, on the part of concerns engaged in the manufacture of telephones and telephone apparatus, that directing notice to any particular one may at first glance seem invidious, but in the present instance special mention of the Globe Automatic Telephone Company, whose busy factory and offices are located at 153 and 155 West Jackson boulevard, Chicago, is intended more as an illustration of the daily growing prominence of the automatic idea, of which they are such lively exponents, than any particular dissection of the *personnel* of the company, which is of the very highest calibre.

There is no need of discussing here the relative merits of "manual" and "automatic" systems. Both are now so well represented in the telephone world by acute, energetic and skillful advocates that it would be unnecessary, even if it were contrary to the object and wishes of the writer, to make comparisons, which, on the authority of such a sage as Shakespeare, are usually regarded as "odious." They would be particularly so in a journal devoted to the interests of all phases of Independent telephony.

As a matter of fact, the ultimate decision between these two enterprising branches of the same dynasty, the "automatic" and the "manual" systems—must be decided by the public themselves and certainly it would seem now, more than ever before, since the "new departure" took form, is the issue being drawn, especially in smaller communities. No matter how ample and cultivable a field may be along any line of commercial effort, a time always comes, sooner or later, when the intrinsic merits of commodities of the same classification have to be submitted to the determining test—the experience of the users.

It is true that increasing discussion of the automatic telephone idea in all journals recording the movements of electrical progress has quickened interest in the subject and would of itself impress the observer of "things telephonic," even if a casual perusal of TELEPHONY'S *Daily Report* did not bring to light a notable increase in the number of exchange owners inviting bids for automatic instruments, but the train of thought which promotes this writing is more immediately the result of a perusal of a booklet just gotten out by the Globe Automatic Telephone Company, containing copies of letters from users of the system manufactured by them, expressive of their opinions, based on actual experience of the workings of automatic instruments for periods ranging from a few months to a few years.

To say the least of it, after reading over this testimony (all signed and dated within the present month), no one, no matter what his bias may be, could fail to feel impressed with the fact that automatic telephony has some very enthusiastic advocates throughout the country and that those who have tried and tested the "Girl-Less" phone are ungallant enough to express their entire satisfaction at the absence of the quondam recipient of "Hellos." Assuming that other companies engaged in the manufacture of automatic instruments can also produce testimony as to satisfactory results, few can doubt that the automatic operation of exchanges has passed through its infantile stage and has assumed the proportions of a very "husky young fellow." The Globe company do not seem to be the kind of people, judged by its virile style of advertising and other marked indications

of strenuousness, that would fail to take advantage of conditions which never looked so promising since the automatic idea first took practical form.

METHOD OF PROCEEDURE IN OBTAINING TELEPHONE FRANCHISES IN IOWA JAN. 1, 1902.

By C. F. Bennett.

(Individual or corporations should grant an agent written authority by individual act, for an individual for an action of a board of directors duly recorded, for a corporation, as a representative in the matter of obtaining the franchise and to sign the name and affix seals in matters pertaining thereto.)

Sec. 1. Have the following resolution submitted to and regularly passed by the ..... council in time to allow four weeks for publication of notices in two newspapers prior to the day the election is desired:

"Resolved, That the mayor and clerk be directed to sign a call and publish according to law, a notice of an election of the qualified voters of this ....., to be held on the .... day of ....., 19.., with the annual municipal election of that date, for the submission of the following question:

"Shall the ..... council of ....., Iowa, grant ....., its successors and assigns, a franchise in accordance with the terms of an ordinance, a copy of which is hereto attached, for the use of its streets, alleys and public ways, for the purpose of erecting and maintaining a telephone system?"

....., Councilman.

(Cut out the words "with the annual election of that date" if it be a special election.)

Sec. 2. If it is not convenient to obtain the passage of the above, present the following, signed by twenty-five of the qualified voters of each ward in the city or fifty property owners in an incorporated town, to the mayor, who, with the clerk, will be authorized and required to call an election and publish a notice in accordance therewith as follows:

To the Mayor of ....., Iowa.

We, the undersigned qualified voters of the ..... of ....., Iowa, hereby petition you to give notice of and make call for an election of the qualified voters of this ..... for the submission of the following questions:

Shall the ..... council of ....., Iowa, grant a franchise to ....., in accordance with the terms of an ordinance, a copy of which is hereto attached, for the use of the streets, alleys and public ways of this ..... for the purpose of erecting and maintaining a telephone system?

Sec. 3. Upon the obtaining of either of the above, have the mayor and clerk sign and publish in one newspaper (or two, if there be two issued in the corporation) for four consecutive weeks prior to date of the election, the following notice of election:

Notice of Election:—To the qualified voters of the ..... of ....., Iowa.

You are hereby notified that in accordance with a resolution of the ..... council of this ....., passed on the ..... day of ....., 19.., there will be held on the ..... day of ....., 19.., an election of the qualified voters of this ....., to vote upon the following questions: Shall the ..... council of this ..... grant ..... a franchise in accordance with the terms of an ordinance, a copy of which is hereafter published, to erect and maintain a telephone system in said ....., and to place its poles, wires, fixtures, etc., in its streets, alleys and public ways? (Substitute "petition of twenty-five qualified voters in each ward," or if it be an incorporated town, "fifty property owners—submitted," in place of "resolution of the cauncil of this ..... passed," if the mayor is authorized by petition.)

(Copy of ordinance.)

Sec. 4. Have ballots of election printed as follows: Shall the ..... council of ....., Iowa, grant a franchise in accordance with the terms of an ordinance herewith submitted, to ..... to erect and maintain a telephone system in said town?

Sec. 5. The clerk shall prepare the ballots and the proposition shall be submitted as provided by statute in the chapter on elections.

Sec. 6. Have ordinance regularly passed as quickly as possible after election.

Sec. 7. Secure a copy of ordinance when passed with copies of all records pertaining to the matter of franchise with one of the ballots of election, if possible, with certificates of the clerk as to their genuineness, and make out acceptance as below within five days after franchise has been granted by council, filling in all dates, and have same signed and acknowledged by some officers of the company, or by the individual to whom the franchise is granted.

Acceptance of ordinance by .....

Whereas, The ..... council of ....., Iowa, did on the ..... day of ....., 19.., with the authority of the qualified voters of said ....., obtained at an election, held on the ..... day of ....., 19.., grant ..... a franchise by an ordinance entitled as follows: "An ordinance granting to ..... the right to erect and maintain its poles and wires upon, above, along or under the streets, avenues, alleys and public places of the ..... of ....., Iowa, on the conditions herein provided." Now, therefore, ... does hereby accept the said ordinance and agrees to all the terms and conditions thereof.

In witness whereof the said ..... has caused this acceptance to be signed by its ..... and ....., and its corporate seal to be affixed hereto this ..... day of ....., 19..

.....

.....

(If individual, say "affixed his signature" instead of "caused, etc.")

Sec. 8. File acceptance with clerk and take receipt therefor with page of clerk's record on which same is copied with location of file and file number, and return same with clerk's certificate of records, etc., as found in Sec. 7, to grantee, who should have all these printed in pamphlet form and originals deposited in safety vault.

Sec. 9. The party applying for the franchise or for a renewal or extension thereof shall pay all expenses incurred in holding the election.

(Some cities, under special charter, require no election. But in these no franchise shall be granted or authorized until after notice of application therefor has been published once each week for four consecutive weeks in some newspaper published in such city.)

ORDINANCE NO. .....

An ordinance granting to ..... the right to erect and maintain its poles and wires, etc., in the streets, alleys and public ways of the ..... of ....., Iowa, on the condition herein provided:

Be it ordained by the town council of ....., Iowa:

Sec. 1. That the right is hereby granted to ....., its successors and assigns, to erect, maintain and use upon, along and under the streets, alleys and public ways of said city the poles, wires, ducts and fixtures necessary and convenient for supplying to the citizens and the public, communication by telephone or other improved methods, under the provisions of this ordinance until the ..... day of ....., 19..

(The statutory limit of franchises is twenty-five years.)

Sec. 2. The lines of poles, wires and other fixtures now placed are hereby accepted and any change therein or

COPYR

COMMON BATTERY MULTIPLE SWITCHBOARD OF THE SINGLE RELAY TYPE, INSTALLED CAPACITY 6,000 LINES, ULTIMATE CAPACITY 12,000; THE TOLEDO HOME TELEPHONE COMPANY, TOLEDO, OHIO.

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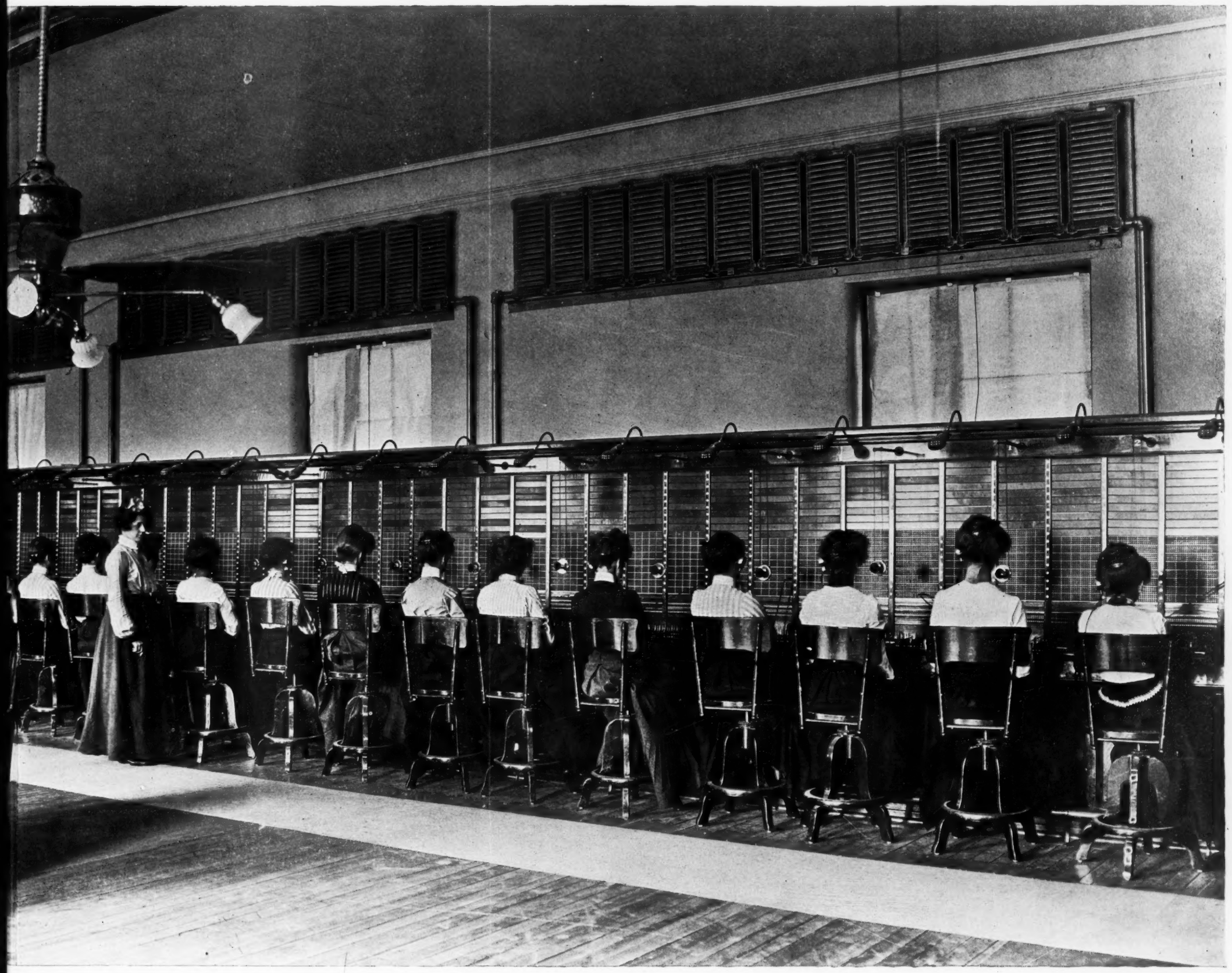

6,000 LINES, ULTIMATE CAPACITY 12,000; THE TOLEDO HOME TELEPHONE COMPANY, TOLEDO, OHIO.

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STERLING

ELECTRIC COMPANY

LA FAYETTE, IND.

One Year's Contracts for Our Single Relay Lamp Signal Common Battery Mutiple Switchboard Equipment:

Toledo, Ohio	6,000 installed	12,000 capacity
Houston, Texas	2,000 installed	6,000 capacity
Cedar Rapids, Iowa	1,500 installed	5,000 capacity
Clarksville, Tenn.	750 installed	2,500 capacity
Davenport, Iowa	1,500 installed	5,000 capacity
Freeport, Illinois	1,050 installed	2,500 capacity
Galesburg, Illinois	1,200 installed	3,000 capacity
Ironton, Ohio	750 installed	2,500 capacity
Joplin, Missouri	1,500 installed	5,000 capacity
Lima, Ohio	1,500 installed	5,000 capacity
Lorain, Ohio	1,050 installed	3,000 capacity
Marion, Ohio	1,050 installed	3,000 capacity
Moline, Illinois	750 installed	2,000 capacity
Newark, Ohio	1,000 installed	3,000 capacity
Canton, Illinois	500 installed	2,000 capacity
Peru, Indiana	750 installed	2,500 capacity
Paris, Kentucky	750 installed	2,500 capacity
Rockford, Illinois	1,600 installed	5,000 capacity
Rock Island, Illinois	1,200 installed	3,500 capacity
Terre Haute, Indiana	300 installed	2,000 capacity
Wichita, Kansas	1,600 installed	5,000 capacity
Ottawa, Illinois	600 installed	2,000 capacity

Please tell the Advertiser you saw his Announcement in TELEPHONY.

LA FAYETTE, IND.

WHILE WE HAVE BEEN DOING SOMETHING IN

Common Battery Multiple Work

WE HAVE NOT BEEN IDLE ON

Telephones
Cable Terminals
Pole Top Terminals
Pole Houses
Distributing Boards
Iron Frame Racks
Complete Protectors
Individual Station Protectors
Tubular Line Fuses
Renewable Fuses
Copper Test Connectors
Standard Bell Type Boards
Sectional Boards
Toll Boards
Chief Operator's Desks
Selective Party Line Phones

and other Telephone Specialties.

OKONITE

THE STANDARD FOR RUBBER INSULATION

OKONITE

OKONITE WIRES. MANSON TAPE.

1889 Paris Exposition Medal.
1893 World's Fair Medal.

WILLARD L. CANDEE, H. DURANT CHEEVER, } Managers.

OKONITE
TRADE MARK.

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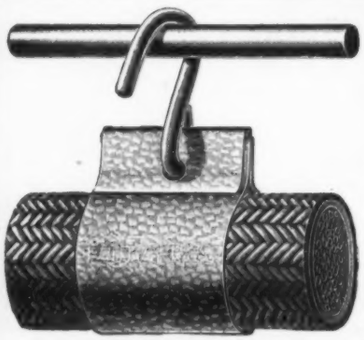
OKONITE TAPE. CANDEE WEATHER-PROOF WIRES.

GEO. T. MANSON, General Superintendent.
W. H. HODGINS, Secretary.

253 BROADWAY THE OKONITE CO., LTD. NEW YORK CITY



WRITE for the WRIGHT and get the RIGHT which is the Wright Cable Hanger

SAMPLES AND PRICES FOR THE ASKING.

R. I. TELEPHONE & ELECTRIC CO.

Manufacturers, 20 Calender Street, Providence, R. I.

Telephone Material

Grow, Conover

Get my proposition before buying. I can save you money.

Purchaing and Forwarding Agents for
INDEPENDENT TELEPHONE CO.'S. Monadnock Blk., Chicago.

Hoffmann Double Grip Cable Hanger

ECONOMICAL, DURABLE and EFFICIENT

Adjustable to any size Cable. No tools required

Write for Prices and Circulars

GREER ELECTRIC COMPANY

60 W. VAN BUREN ST., CHICAGO

Shortage of Locust Pins.

For the last ten years we have manufactured Locust Insulator Pins until our sales have amounted to many million of pins annually, and we are unable to fill orders owing to the scarcity of locust.

This timber has been drawn on largely for wagon hubs, fence posts and insulator bl nks. A great amount of locust timber has been unnecessarily destroyed by inexperienced operators, until at present it is an impossibility to get enough to answer the necessary requirements. The timber has been culled over so often and the small amount remaining is almost inaccessible, having to be hauled by teams over mountainous roads from twenty to thirty mi es, thus increasing the cost of locust blanks. In the past two years the price for blanks has advanced 100% and will not stop at this, owing to manufacturers in other lines using locust, paying $4.00 to $5.00 per M. more for the timber than the manufacturer of pins can afford to pay with the selling price of locust pins at present time. This would mean that the next season will see prices higher or a greater scarcity of locust pins than we have exper enced the past seven months.

We have given this matter considerable attention, and after experiments extending over a period of two years, we are able to offer a substitute which will answer all requirements necessary for long life and strength.

In introducing this substitute, we are endeavoring to relieve our customers of the uncertainty and inconvenience in being supplied with an insufficient amount of locust pins and we feel assured that when once given a trial, will establish our claim and result in the permanent use of this article.

Our "Calpa" pin is a close dense fibred wood, atmospheric conditions having little influence on same, and for this reason one of the best substitutes for locust in the market.

Will quote prices on application and mail a few samples for examination and test.

E. J. NOBLETT CO.,

Dept. B, 902 35th St. CHICAGO. ILL.

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DO YOU WANT THE BEST BATTERY ON THE MARKET FOR TELEPHONE USE?

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No. 2 "SPECIAL" With Stick Zinc

No. 3 For Extra Heavy Work Requiring Large Current.

STRONGEST AND LONGEST LIVED

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